HANDICAPPED EMPLOYMENT

EMPLOYMENT AIDS FOR PERSONS WITH VISUAL DISABILITIES

EMPLOYMENT AIDS FOR PERSONS WITH VISUAL DISABILITIES

The Handicapped Employment Program is a part of the Ontario Ministry of Labour. The objectives of the program are aimed at promoting equal opportunity in employment practices for persons with disabilities. In addition, the program emphasizes the abilities and independence of people with disabilities.

The Handicapped Employment Program wishes to thank Patti Fuhrman who researched, compiled and wrote this manual while under contract with the program.

This guide is also available on taped cassettes. Cassettes and print copies are available from:

The Handicapped Employment Program,
Ministry of Labour,
400 University Ave, 10th Floor,
Toronto, Ontario M7A 1T7
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HOW TO USE THIS MANUAL

The Table of Contents lists technical aids in major categories, for example, "paperless braille devices". Under each major category is a listing of product names. In addition, following the Table of Contents, is an index of occupations in alphabetical order. Beside each occupation will be one or more page numbers indicating that on those pages will be found devices of use to a person holding that occupation. It should be noted, however, that it would be impossible to list all occupations for which the equipment is useful and the user is encouraged to investigate aids for similar occupations.

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EMPLOYMENT AIDS FOR PERSONS WITH VISUAL DISABILITES

INTRODUCTION

Modern technology has made possible the development of many aids and devices which augment or replace a sense or motor skill which has been lost or diminished. In many employment or educational situations, acquisition of an appropriate aid can increase a disabled person's productivity and enhance his or her vocational and educational horizons.

There is no question that appropriate aids have a significant impact on a disabled person's performance in the job market. Frequently, for persons with disabilities, aids can make the difference between getting and not getting a particular job, or successfully completing particular educational programs. Once employment is acquired, technical aids may make it possible for a person with a disability to work competitively within the time and quality standards required of non-disabled workers performing similar tasks.

The material in this manual is presented with the intent of acquainting interested parties with the available aids which have specific applications in developing and expanding employment opportunities for persons with visual disabilities. In listing possible employment applications, it is understood that one person may benefit from a device which another person cannot use efficiently. Service and maintenance for equipment may vary from place to place, and the cost of service contracts for high tech equipment should be investigated as they are often necessary.

Funding

Funding of technical aids is provided for the clients of three agencies:

Canada Employment and Immigration Commission
Worker's Compensation Board, and
Vocational Rehabilitation Services of the Ministry of Community and Social Services.

You will find local contacts in the blue pages of your telephone directory. Other sources of funding include insurance companies (under disability insurance coverage) service agencies, and charitable foundations.

State-of-the-art Focus

There are many other useful items which are not listed in this guide such as unmodified typewriters, braille slates, time keeping devices, daily living aids, and other standard office equipment with which the visually disabled community is generally familiar. This manual will include primarily those items which are state-of-the-art and which might open up employment opportunities in new areas. For other aids, you can try the CNIB, Low Vision Association (Toronto) and the Samual Harris Baker Foundation (Toronto). Bell Canada Special Needs Section and Radio Shack Incorported are also useful souces of information. They are both conducting research into equipment modification for the disabled.

No Endorsements

It is important to note that the Ministry of Labour does not market or evaluate any products. The information contained in the manual is current to December 31, 1983, however, rapid advancement in technology is a factor which leads to quick obsolescence, consequently this manual should be used as a resource. Interested parties are encouraged to contact vendors for additional information on updated or new products, to verify specifications, options, availability, service and maintenance guarantees, time and methods of shipping, custom costs, if any, and current price.

ABBREVIATIONS

The following is a list of abbreviations used within this manual.

AC	alternating current
ap(aps)	amperage, amperages
ASCII	American Standard Code for Information Exchange
baud	the reciprocal in time of the shortest code element
baudout	a particular five bit code
bcd	binary code decimal
bps	bits per second
c	celsuis, centigrade
cm	centimetres
CPU	central processing unit
CRT	cathode ray tube
d	deep, depth
DC	direct current
dia.	diameter
DOT	dictionary of occupational title,
ebcd	extension binary coded decimal,

EIA	electronic industry association,
f	fahrenheit,
fifo	first in, first out,
f.o.b.	free on board,
h	high or height,
Hg	mercury,
ips	inches per second,
lb (lbs)	pound or pounds
LED	light emitting diode,
lsi	large scale integrated,
m	meter,
mm	millimeter,
oz(ozs)	ounce or ounces,
PBX	private branch exchange,
prom	programmable read-only memory
psi	pounds per square inch
ram	random access memory
rf	radio frequency
rpm	revolutions per minute,
TDD	telephone device for the deaf,

ttl	transistor-transistor logic,
TSPS	traffic service position system,
tty	teletype,
vu	volume unit,
wpm	words per minute

EMPLOYMENT AIDS FOR PERSONS
WITH VISUAL DISABILITIES

BRAILLE DEVICES HARDCOPY

Braille Shorthand Machine Model J

Function:	Produces braille shorthand on paper tape for taking down letters, reports and other information from dictation.
Employment application:	Secretaries, research assistants, reporters, teachers and others who take notes from dictation or who require fast means of making braille notes.
Description:	A very quiet, easy to use portable hand-powered machine built onto a solid base which acts as the bottom of the carrying case. The lid of the case is removed when operating the machine. The six keys plus space key have plastic key caps. Braille is produced on a narrow paper tape from a roll suspended to the right of the machine and fed under the braille matrix from right to left. Improved suspension increases quiet operation. Other features include, adjustable tension and extension arms to enable a fully brailled roll of tape to be wound back. Speeds of up to 140 wpm can be attained, one roll of paper holds approximately 50 average business letters. Unit in case measures 12-1/4 inches by 7-1/4 inches, weight: 6lbs, 6ozs uses paper rolls, catalogue number 9132.

Vendor: Royal National Institute for the Blind,
224 Wayportland Street,
London, WIN, 6..11 England.

Perkins Electronic Braille Writer

Function: Produces braille on standard paper 11-1/2 by 11.

Employment application: Secretaries, research assistants, and others who produce letters or reports from dictation.

Description: Produces braille from seven key keyboard in sleek enclosed case. Machine is sturdy. Brailler is light in touch so that machine does not "walk" across a desk when in use. Braille is embossed uniformally regardless of touch on keys. Paper carriage is self aligning. Unit has adjustable left and right margins stops, and warning bell for right margins. The machine is relatively quiet in operation. An optional carrying case may be ordered. Weight: 11 lbs.

Vendor: Howe Press of Perkins School for the Blind,
Watertown, Massachusetts 02172
Telephone (617) 924-3434.

Cranmar Modified Perkins Brailler

Employment use: Too wide ranging to specify or limit here.

Description: Cranmar modified Perkins braille writer is a braille oriented computerized device capable of braille and buffing, editing text and interacting with computer at a smart

terminal. Based on the Perkins braille writer, the Cranmar Modified Perkins Brailler houses electronic components and electronic keyboard and various input output connectors, keyboard resembles traditional Perkins keyboard but is electronic and requires minimal pressure to activate. The carriage return line feed and backspace levers have been omitted from the CMPB as functions are controlled from the keyboard. A variety of audio signals alert the user of the CMPB's status, long high pitched beep indicates that the buffer is nearly full. CMPB stores text in a four thousand character buffer which can be downloaded to a standard tape for permanent storage. This information can be recalled from tape for editing or printing. The Cranmar Modified Perkins Braille writer can also be used to produce graphics in "graphic mode m", can be used as a braille printer; it also functions as a stand-alone unit similar to an electric brailler.

Vendor:

Syntha Voice Computers
Hamilton, Ontario
Telephone (416) 578-0565.

PAPERLESS BRAILLE DEVICES

Braille has not been superceded by other forms of non-visual media despite numerous predictions to the contrary. Although audio systems such as tape recorder and aids with tactile or speech output play an important role in giving blind persons access to information, braille is still supreme in its use for reference and technical material. Another important aspect is that a blind person can write braille without having to invest in expensive equipment.

However, braille embossed on paper has a number of disadvantages. Typically a braille book will occupy twenty times the volume of its

equivalent increment. This fact provided the initial impetus for the development of systems for storing braille very compactly. Numerous systems have been tried including coding braille as dots on micro-fiche. In paperless braille systems the braille is displayed by an array of pins which can be raised to represent the braille characters. There have been technological problems in producing an inexpensive reliable display which is comfortable to read.

Recent developments have concentrated on adapting computer technology for the digital storage of braille on tape or disk. The decreasing cost of the micro-processors has permitted the introduction of sophisticated editing facilities.

Most manufacturers offer interfaces for connecting to printers, so that the braille data can be produced in print. However, most of the present systems will only operate in this mode with uncontracted braille. Word processing facilities such as automatic centering of headings, underlining, page numbering, are not provided as standard on any of the commercially available devices. However, programming packages to include those features are being developed and some are in fact for sale currently.

Brailink

Employment Use:	Facilitates employment of blind persons in a computer environment.
Description:	The brailink three is a self contained portable smart computer terminal with braille display. The terminal is designed to be used off-line or direct on-line to the computer. The blind user may thus create or reverse data and directories in the home or office while still using procedures similar to the main computer operating system. Many standard computer interfaces are incorporated in a single carrying case.

The terminal consists of three user facilities:

1. The forty-eight character strip can display half a standard VDU line of data.

2. The keyboard can be switched between two models. For terminal type operations the standard 56 qwerty mode will be preferred. For personal files and reports, the six key Perkins mode enables contracted braille-to-braille to be used for faster reading. Buffer control buttons are located by the display strip for easy reading. Buffer edit and line control are duplicated on the keyboard.

3. Two digitial data cassettes allow full editing of files to be executed, such as inserting unlimited blocks of new data anywhere in the multi-block tape. This editing process is based on the simple search and copy facilities to find any specified word or sentence in the buffer or on the tape. Data is written in full blocks of half a braille page; a cassette stores 150 blocks. The text editor is line based with automatic buffer line numbering and data indication. The tapes that it uses are two track Phillips cassettes.

The system includes three RS232-C interface ports, and handshaking protocols for a range of computers are available. The ports can operate at different bog race.

Vendor: Clark & Smith International Limited,
Melbourne House, Melbourne Road,
Wallington, Surrey, SM6 8SD, England.

Canadian Distributor: Ms. D. Mayne,
P.O. Box 6076, Station A,
Toronto, Ontario M5W 1P5

Braillex - C

Employment Use: Facilitates employment of blind persons in a computer environment.

Description: Braillex comprises an electronic #87 on tape counter. The register or part index function permits unsequenced information to be stored after entry of a code word (key concept). The entry of the code word is invariably performed in Braille. The input of information relating to the code word can be done at the user's option in spoken language or braille. A selective display of the memorized data is obtained by simply entering a specific code word. For calling the memorized information, the user will enter the specific code word in braille through the braille keyboard. The code word will appear on the braille display for checking by the users. Operation of the "search" key is then sufficient to call all information stored under this specific code word and initiate the readout in braille or spoken language. The dictionary function is intended for calling numerically or alphabeti-cally sequenced key concept and information of the dictionary type. There is a built-in logic circuit for retrieval of the key concept or information to the position of the magnetic

tape. The electric typewriter module serves not only for checking and correcting the typewritten text which appears simultaneously on the braille display but also enables the user to file a copy of the typewritten text in braille on the magnetic tape after entering a code word. One or more keywords can be elevated to the same portion of the text. The text can be recalled, one of several keywords. It is also possible to search for word fragments. Another feature is that there is no limitation on the relationship of keywords to text and vice-versa; text can be as long as required, keywords can be entered nearly as required, and in practice, without limitation on the number of characters. Within the memory, every word in the volume of the text (maximum 4,096 characters) can be pointed out as an additional sub keyword. Within the memory the access time is less than one second. All data stored on tape can be changed and or corrected with a choice of commands. As this device has the capacity for continuously reading a book stored on cassette tape (braille or audio) it may also be benefical for personal use.

Vendor: F.H. Papenmeir, Braillex Divisions, Talweg 2, Postfach No. 1620, D5840 Sthwerte, Federal Republic of Germany.

Braille - Notex

Description: Pocketsize electronic notebook to store braille with the capacity of 8,000 braille characters. To read the storage text braille - notex is connected to a braillex and the data transferred to the braillex.

Digicasette

Description:

The digicasette DC-20M meter incorporates a 20 cell braille display, a cassette tape unit and a braille keyboard. Cassettes of any length can be used and no performatting is necessary; a C90 cassette can contain 288,000 characters about 240 braille pages, Braille and sound can alternate on the same track without interfering with the other track and will be automatically recognized. Programme cassettes will allow the user to load specialized application software into the programme memory. Facilities include automatic tape indexing by the cord numbers, transfer of text from one tape location to another, from one tape to another. A 2,000 character storage provides a full word processing capacity with all attendant editing functions (delete, insert, find, save, cursor, left, right, up, down, and other functions attributable to word processing on video terminals). All commands are performed from a braille keyboard.

A plug in micro-processor controls interface and allows data transmission to and from computers. The device can also be interfaced to electronic calculators and typewriters.

Manufacturer:

Triformation Systems Incorporated,
3132 South East "J" Street,
Stuart, Florida U.S.A. 33494
Telephone (305) 283-4817

Versabraille

Description:

The versabraille incorporates a braille keyboard, at 20 cell parallel instantaneous presentation braille display, and a high speed digitial cassette drive. The systems information organization is the same as a book, with a table of contents, chapters, pages and paragraphs.

Audio information can be recorded on the same tape under braille chapters titles if desired. Four hundred pages of braille can be stored on a C60 cassette, 200 pages per side. This corresponds to 400,000 characters. Up to 50 chapter titles can be assigned to each tape side. The chapter length is at the discretion of the user. Automatic location of chapters and pages and audio recordings, para-graphs and text strings can be located within a specific page. Average time for random access of any page is 16 seconds on a full cassette. Editing facilities permit the insertion, addition, deletion or substitution of text strings within a one thousand character page. Chapter titles can also be changed.

A built-in interface permits the connection by the user of a versabraille to a computer, printer or other versabraille (for intelligent duplicating of cassette). With the development of a software program entitled versatext, the versabraille is now fully functional as a word processing unit, naturally one has to add a printer for output. A very important note is that the versatext has a bidirectional grade two braille translator.

Vendor in Canada: Technibility Incorporated,
67 Ontario Street,
Toronto, Ontario
Telephone (416) 947-0730.

Tellatouch MS-170

Function: A simple device for communicating with a deaf-blind person who knows braille.

Description: It is 9" square and 2-1/2" high. Keys are arranged like those on a standard typewriter keyboard, and there are also six keys similar to those on a braille writer. Depressing a key on the keyboard will activate a braille cell on the other side of the Tellatouch. The individual, with his or her forefinger on the braille cell, can then feel the letter (or contraction) activated by the keyboard. This machine is shipped post-paid anywhere within the United States. On shipments abroad the U.S. packing, postage, and insurance charges are additional. Tellatouch is not a typewriter or braille writer.

Vendor: American Foundation for the Blind,
15 West 16th Street,
New York, New York 10011
Telephone (212) 620-2170

CALCULATORS WITH BRAILLE PRINTOUT

Employment application: Business persons, clerks, bookkeepers working for firms, accountants, inventory personnel, marketing personnel who figure estimates or analyze market research data; engineers, scientists, mathematicians.

Calcu-Tac Electronic Calculator T.8.

Function: Provides braille paper tape printout of scientific and business electronic calculator display.

Description: Adaptation of existing calculators to provide braille output on request model T8A is a Victor 204 twelve digit machine with four function mathematical capabilities, memory, accumulator key and braille print key. Model THAP is a Victor, 332 twelve digit machine with similar functions plus an ink print key and braille printout key. Model T8B is a kingspoint scientific calculator which has eight digits, algebraic transcendental function, and braille printout key. Braille printout of the display is produced on one-half inch width paper tape. The braille printer is attached to the calculator case. Power 124 alternating current line power Model T-8A and T-8AP are approximately ten inches wide and twelve inches long, five inches in height and weighs ten pounds. Model T8B ia approximately ten inches wide, ten inches long, five inches high and weighs seven pounds. The braille printer is built-in.

Vendor: Science for the Blind Products,
P.O. Box 120,
Bala Cynwyd, Pennsylvania 19004.

Electronic Tone Calculator Model B1000

Function: Provides beeping tone output of display of portable four function electronic calculator.

Description: Has standard calculator keyboard with function keys around the outside and number entry keys in the middle. The number five, is marked with a raised dot. The functions include addition, subtraction, multiplication, division, percentage, constant and memory which allows storage and recall of numbers.

Unit has eight digit display automatic floating decimal point, and algebra logic. Auditory output uses a series of beeps to indicate each number: one beep for number one, two beeps for number two, etc., zero is indicated by ten beeps. A background tone indicates the decimal point follows the number being transmitted; constant tone indicates overflow condition. Audio repeat key allows answer to be repeated as often as needed without affecting information on the screen. Special keys allows user to check for negative number.

Has on/off volume control and variable speed control; includes headphone jack. Print or braille operating instructions available. Power internal, rechargable batteries or 110 volts alternting current. Weighs 26 ozs.

Vendor: Attention: C.H. Wood, Marketing Manager,
Ball Brothers, Research Corporation,
P.O. Box 2078,
Boulder, Colorado 80302
Telephone (303) 441-4682.

Speech Plus

Function: Provides voice readout from all functions of a general calculation electronic calculators.

Description: Calculator is an eight digit six function solid state with floating decimal point, automatic constant change sign key, independent memory (more powerful than accumulated memory) memory squat, overflow indications and recovery. A 24 word vocabulary consists of words: 0-9, point, plus, minus, times, squat, equals, over, m(root), percent, clear, overflow and low voice output from all keys. Speech rate of 1.5 characters per second. Silent or announced entry modes. Earphone or loud speaker modes; and battery low warning. Also available in French, German and Arabic language models. Functions include: the four arithmetic functions, percent, and square root. Controls include on/off switch, separate voice on/off switch, and volume power, battery operated nickel-cadmium aa batteries. Separate 115 volts alternating current adapter hertz 50-60 battery charger. It has light emitting diode visual display; keyboard arrangement similar to touchtone phone; has carrying case. Optional set inhibiting cable. Instructions in print, plug option of braille or cassette tapes, are available.

Vendor: Telesensory Systems Incorporated,
3408 Hillview Avenue,
Palo Alto, California 94304
Telephone (415) 493-2626.

Author's Comment:
Although this calculator is of good quality, it is not as portable as recent models on the market and is comparatively expensive.

Talking Calculator Model ARC 9500

Function: Provides voice readout from general calculation electronic calculator.

Description: An eight digit, eight function, fixed or floating decimal point, solid state electronic calculator with voice output of four basic functions plus all numeric entries and results. A sixteen word vocabulary consists of numeric words 0 to 9, plus, minus, times, divide, equals, and decimal point. Operations include learning mode with repetition of each number as entered, fast mode with audible output of function entry and answer and calculator mode, with audio output upon demand by depressing audio repeat key; output jack for headset and external recorder; audible overflow alarm; volume control; additional non-audio functions including square, square root, percentage and reciprocal functions; has accumulative memory mark up and discount keys. Controls include on/off switch, audio reset, audio repeat and volume, power 110 volt alternating current 230 volt, alternating current rechargable batteries.

Vendor: Master Specialties Corporation,
1640 Monrovia,
Costa Mesa, California 92627
Telephone (714) 642-2427.

This is also a fairly expensive calculator.

Pocket Size Sharp Talking Calculator EL 620

Description: Pocket size, talking calculator. Four functions including: percent, square root,

memory, alternating current adapter is extra. To date, costs less than $100.

Sharp Electronic EL 640 Calculator Clock and Calendar

Description: Pocketsize talking calculator clock and calendar similar features to calculator listed above with the exception of square root. Unit contains a count down timer which may be useful for those who require specific timing on an employment or educational project.

Sharp Electronic Calculator Speech Output EL 7100 Memo Writer

Description: Hand held talking calculator with visual display and paper printout. Printout is opticon readable. Keyboard modelled on a standard typewriter. In addition to talking calculations this machine can be used to produce memos etc. Battery operated only.

Sharp Electronic Calculator EL 8301

Description: Similar function to those calculators listed above. Large print display. El 1601 same as EL 8301 but has a paper printout. No speech in either models.

Catheo Clock Calendar Calculator

Description: Same functions as those listed above.

Vendor:

For all of the above calculators:
IRTI,
375 Distelcircle, Suite C4,
Los Altos, California 94022
Telephone (415) 965-8202.

Also certain calculators are carried by:
The CNIB,
1929 Bayview Avenue,
Toronto, Ontario
Telephone (416) 486-2500, ask for the
Homecraft department.

COMPUTER ACCESSORIES

Punch Card Reader

Function:

Enables blind person to determine characters on punched computer cards.

Employment application:

Computer programmers who do their own card key punching, keypunch operators, programmers who must debug programs punched on cards by others. User must be familiar with Hollerith coding.

Description:

Two models are available. One is an electronic model. It uses photo cells under the card and a light source above to trigger the presence of a hole. A row of twelve celluloid activated pins on the front panel of the instrument form the display. Each pin identified by a braille symbol. The second model is a mechanical system. A column of twelve mechanical spring-activated pins presses against the card. Where holes have been punched in the given column the pin protrudes and provides tactile information

about the location of the punch. Measures 6" by 4". Accommodates standard computer cards.

Vendor: J.C. Swail, Medical Engineering Section, Electrical Engineering Division, National Research Council, Ottawa, Canada K1A OR8

COMPUTER TERMINAL/DATA PROCESSING

Automatic Data Entry Terminal

Function: Locally prompts blind operator to enter data into a terminal on a typewriter-style keyboard.

Employment application: Data collection clerks, personnel who interview clients, then fill out forms and enter data into computers such as hospital, university or social security clerks, or service representatives to name only a few.

Description: System includes a desk top computer and a talking interface. The device vocally prompts the operator to enter data on a typewriter keyboard. When the data entry is complete, pressing a button tells the printer to fill out the form with the data. The machine can be programmed to prompt the operator for almost an data entry package. Data entered can be proofed and corrected by speech output. Activated by cursor keys on the keyboard.

Power: 115 Volts AC.
Desk top portable weighs approximately twenty pounds; printer is separate.

Vendor: Maryland Computer Services Incorporated,
101 Thomas Street,
Bel Air, MD 21014
Telephone (301) 838-8888.

In Canada contact:
Syntha Voice Computer Services,
Hamilton, Ontario
Telephone (416) 578-0565.

Braille Page Embossing Terminal LED-1

Function: Produces braille output in page form when used in any teletype compatible communications system, or as a remote printer for computer systems. With standard keyboard and interface, the unit is an interactive computer terminal.

Employment application: Radio broadcast personnel who read newswire and weather service information from teletype systems; lawyers who require access to law data, computer programmers. Potential users should investigate availability of service and maintenance at job site. On-site national service available through Honeywell and/or Sorbus Corporations. Ask the vendor regarding warranties and service arrangements.

Description: Produces braille readout on standard computer paper or braille paper. Standard features include 96 ASCII character array keyboard, ASCII and Baudout input code, TTY and EIA interface, full and half duplex load, out-of-paper audible alarm, interactive operating speed of ten or fifteen characters per second with other data sources (modem, data, CPU), Baudout interface at 100 wpm, 75, 66 and 60

speeds. Braille code may be user selectable. Call vendor for details and specific applications.

Power: 115 volts AC.
Options include full ASCII keyboard with interface; optional interfacing; optional input code, switchable seven and eight braille dots in ASCII mode (include transparent mode operations which allows all control characters to be printed); carrier detects tactile indicator which signals when operator has established carrier to another communications device or computer.

Power: 220 volts AC

Vendor: Triformation Systems Incorporated,
3132 S. E. "J" Street,
Stuart, Florida 33494
Telephone (305) 283-4817.

Braille Printer LED-120

Function: Provides high-speed braille printout, primarily from computers. With keyboard, can be used as a fully operational computer terminal. Does not require special software or other intervention in normal computer operations.

Employment application: Computer programmers using large quantities of printout; production of braille books. Potential users should investigate availability of service and maintenance at job site. On-site maintenance service available through Honeywell and/or Sorbus Corporations. Query vendor regarding warranties and service arrangements.

Description: The LED 120 line embossing device has standard features which include ASCII communications input; ASCII 96 character array keyboard; 110, 150, 300 and 1200 baud operations; alarm and tactile warnings; full and half duplex; local and on-line mode; 25 and 31 lines per page spacing; paper-out alarm and tactile indicator. Unit produces six dot braille cell with optional seventh and eight dot per full ASCII coding and speeds up to 120 characters per second. Operates in EIA and TTY interface mode, others optional.

Power: 120 volts AC.
Options include 220 volts AC; 128 character array keyboard, ebcd, bcd, correspondence and Baudout codes, other codes with eleven bits per character or less, interface and conversion electronics for optional code, 202C type data set option. Unit uses fan fold sprocket fed, continuous paper, 80 to 110 lbs. test.

Vendor: Triformation Systems Incorporated,
132 S.E. "J" Street,
Stuart, Florida 33494
Telephone (305) 283-4817

(Note: listed in Section 1 Braille Services, Hardcopy, you will note that the Cranmar modified Perkins brailler is described. It too may be used as a low-speed printer for limited print-out use, but it does not have automatic sheet feeder, for example.)

Data Terminal Model 100A

Function:	Provides access to a computer through a data terminal with spelled-speech output. Also performs as a regular CRT terminal for sighted persons.
Employment application:	Computer programmers, reservations clerks, dispatchers, hospital data entry personnel, others who use data entry terminals connected to a central host computer.
Description:	A Hewlett-Packard 2645 CRT terminal modified to produce spelled-speech output of either keyboard entry or computer respond, on command from a computalker speech synthesis module. Terminal has a standard ASCII keyboard, CRT display is 24 lines each of 80 characters. Sophisticated command set allows user to scan material and obtain spelled-speech output of selected portions. Data can be read vertically as well as horizontally. Unit is compatable with all HP 2645 communications options; with proper interface option can communicate with most computers. Vocal output is a variable-rate, spelled-speech presented through an earphone or loud speaker. Both have volume controls.Readout rate can be varied from 2-10 characters per second.
Power:	110 volts AC
Vendor:	Speech Systems Incorporated, P.O. Box 11356, Palo Alto, California 94306.

Interactive Strip Embosser ISE-1

Function:	Provides high speed braille output on paper tape from computer or built-in keyboard. Unit interacts with the computer via a built-in acoustic coupler, as well as serving as a printer.
Employment application:	Computer programmers, data entry clerks, others who interact with computers and require braille output hardcopy. Potential users should investigate availability of service and maintenance at job site. On site national service available through Honeywell and/or Sorbus Corporation. Mail readout on a teletype punch paper tape; has built-in keyboard and modem. Query vendor regarding warranties and service arrangements.
Description:	Produces braille readout on teletype punched paper tape; has built-in keyboard and a modem which allows operator to interact with the computer. Standard features include ASCII input code, 96 character keyboard, and originate-only modem.
Power:	115 volts AC. Comes packed in its own cabinet and is desk top portable. Options include 220 volts AC adaptor. Query vendor regarding specific applications and options available.
Vendor:	Triformation Systems Incorporated, 3132 S.E. "J" Street, Stuart, Florida 33494 Telephone (305) 283-4817.

Information Through Speech (ITS)

Function:	Allows user to access a full range of computer capabilities. Capabilities determined by software acquired.
Employment application:	Full range of employment possibilities: Query vendor for a full range of uses and available accessories.
Description:	Stand-alone micro-computer based on the Hewlett-Packard 125, which can be connected to other computers as a terminal, information shown on the CRT, visual display screen, is spoken in a clear easily understood voice. The system consists of a micro-computer, visual display screen, disc drive, and detachable keyboard, voice controls and components are housed in the micro-computer, rate of speech can be adjusted from 45-720 wpm. A variety of software packages are available to meet the needs of students, employees and professionals. Learning disabled persons may also benefit from this system as it is a speech output. Grade two braille translator is available; it is not a bi-directional translator which means you can only input from the keyboard into the standard typewriter keyboard into the computer and receive Grade 2 braille on your printer. Cannot be inputted for example, through the Cranmar modified Perkins braille writer in Grade 2 and receive printout from the printer you are using. Standard CPM programs can be used without modifications.
Vendor:	Syntha Voice Computer Services, Hamilton, Ontario Telephone (416) 578-0565

Key Pact Computer Terminal

Function:	Allows user to request life insurance and estate planning data analysis from central computer by telephone at point-of-sale, and receive verbal reply from the computer.
Employment application:	Insurance sales persons, estate planners, brokers who work with clients away from central office; others who travel but need data analyzed while in the field. Additional tactile identification of some switches may be required.
Description:	Consists of a keyboard or thumb wheel with array, modem and speaker in a briefcase which allows the user to set up a request for a particular type of financial data analysis for transmission to a central computer. The unit has a built-in modem (accoustic coupler) for data transmission over ordinary telephone lines, and has a built-in speaker for verbal computer response. Printed copies of the analysis may also be produced on some models from information sent from the central computer facilities. Several models are available (model micro-VIP 200 has thumb wheel rotary switches for input and voice response only. Micro-VIP 400 has some wheel rotary switch input, voice and print response. Micro-VIP 600 has some wheel switch and alpha-numeric keyboard input, voice and print response. Models may be upgraded to printer and/or keyboard. Query vendor. Unit is enclosed in a Samsonite style attache case; fits under an airline seat.

Vendor: Key Pact Division Computone Systems Incorporated, One Dunwoody Park, Atlanta, Georgia 30338 Telephone (404) 393-3010.

Sagem Braille Embosser TEM 8-Br/REM 8-BR

Function: Operates as a computer terminal with braille page output.

Employment application: Computer programmer, data entry clerk, inventory control, hospital and health field; reservation clerks and others who require computer access.

Description: Floor standing braille embossing unit can be interfaced with existing on-site or remote computer or information processing systems. When connected to computers, teletype, or data bank, Model PEM 8-BR performs a send-receive facility to produce braille pages of information at up to 150 wpm; ten or fifteen characters per second.

Features include standard typewriter terminal keyboard, interpoint braille (braille on both sides of the paper) produced on sand fold paper either 31 character or 40 character in width; RS232 compatibility; tactile indicators to identify functional modes such as power-on, uppercase, alarm, local, remote, punch-on; automatic indexing to the top of a page; and an out-of-paper alarm. Unit uses ASCII input mode. Other modes are optional.

Power: 115 volts AC. Other voltage settings internationally.

Options: An optional tape leader/punch allows production of multiple copy braille pages. A punched paper tape is produced simultaneously in the send or receive mode. The tape is then used to produce multiple copies of braille pages. Unit also accepts any ASCII coded tapes of this size and produces braille from it. An optional integral six key braille keyboard permits direct input of braille into the host computer or remote terminal via telephone line. Model REM 8-BR is a receive only terminal which produces braille pages as described above. It also will produce a punched paper tape of code received if tape punch is added as an option.

Vendor: Telesensory Systems Incorporated,
3408 Hillview Avenue,
Palo Alto, California 94304
Telephone (415) 493-2626.

Slave Crossing Device BD-3

Function: Provides high speed braille output on paper tape from a computer or other instrument with digitally coded output. Unit is a printer, does not interact with computer.

Employment application: Computer programmer, radio and television newscaster, credit card clerks, stockbrokers, medical technologists, telephone service representatives, others who require braille output from teletype or digitial communication systems. Potential users should investigate availability of service and maintenance at job site. National services available on-site through Honeywell and/or Sorbus Corporation. Query vendor regarding warranties and service arrangements.

Description: Unit produces braille printout on teletype punch paper tape when used to read the output of a computer, keyboard or digitally-coded-output instruments. Standard features include ASCII, selectric or Baudout input codes; EIA or TTY interface (other interfaces optional) does not interact with computers.

Power: 115 volts AC.
Packed in an American tourister briefcase, is desk top portable; weighs about 15 lbs.
Options include 220 volts AC operation.
Query vendor regarding specific application and options available.

Vendor: Triformation Systems Incorporated,
3132 S.E. "J" Street,
Stuart, Florida 33494
Telephone (305) 283-4817.

Talking Computer Terminals

Function: Provides spoken output of ASCII character set components of either incoming or outgoing data from desk top computer.

Employment application: Computer programmers, information retrieval and data entry personnel; airline and hotel reservation clerks.

Description: System includes Hewlett-Packard desk top computer and a talking interface. Computer terminal can communicate with other computers in several modes; can store data within the terminal or on an internal tape cartridge. Speech portion of the terminal can scan either incoming or outgoing data from the tape or computer. Outgoing data can be

prepared off-line and stored on tape for transmission to the computer. Speech output consists of 64 word vocabulary allowing an entire ASCII character set to be spoken.

Power: 115 volts AC.
Desk top portable.

Vendor: Maryland Computer Services Incorporated,
101 Thomas Street,
Bel Air, Maryland 21014
Telephone (301) 838-8888.

Total Talk 2

Function: Provides spoken output of either incoming or outgoing data from desk top computer.

Employment application: Computer programmers, information retrieval and data entry personnel, airline and hotel reservation clerks. Any other person who finds computer useful in employment.

Description: Total Talk 2 is a talking computer terminal. Information appearing on CRT screen or entered through keyboard is spoken in a clear and easily understood voice. Unit is based on Hewlett-Packard HP 125 computer. Pitch, tone, volume and rate of speech are adjustable. Usable by students, employees and professionals or at home.

Vendor: Syntha Voice Computer Services,
Hamilton, Ontario

Talking Telephone Directory

Function:	When user types requested name on to typewriter-style keyboard, unit responds vocally with telephone number corresponding to name.
Employment application:	Information operators; operators in hospitals, universities, office buildings, municipal, provincial and federal government workers.
Description:	System consists of a desk top computer with typewriter-style keyboard, plus control keys, a speech box with connecting cables, visual display, built-in paper tape printer, and tape cartridge or separate optional disc. The operator types the requested name through on the keyboard. The Talking Directory responds with the proper telephone number. If the machine questions an entry, it vocally prompts the operator for more information. System with tape cartridge can store up to 14,000 names; with added cartridges, floppy discs, or hard disc drives up to one million names. The system is capable of duplicating existing directories for back-up purposes, or for multi work station systems. System retrieval time is six seconds with tape cartridge, two seconds with optional disc, faster than most sighted operators can respond. Vendor offers assistance in training, loading information into the Talking Directory, and instructional manual, warranty and maintenance. Query vendor regarding details.
Power:	115 volts AC.
	An optional master disc unit stores approximately 25,000 names and controls up to

seven slave disc units, allowing storage of additional blocks of 25,000 names each. For information on printer options and custom designed large installations, contact vendor.

Desk top portable disc drive unit is separate. Floppy disc drive is rack-mountable or desk top portable. Hard disc drive is racked or floor mounted stationery unit.

Vendor: Maryland Computer Services Incorporated,
101 Thomas Street,
Bel Air, Maryland 21014
Telephone (301) 838-8888

Talking Word Processing System

Function: Provides spelled-speech output from word processing system.

Employment application: Typists, secretaries, medical and legal transcribers, workers who prepare technical reports, manuals, catalogues or documents; anyone who prepares typed materials.

Description: System is based on a Hewlett-Packard 9825 desk top computer; allows full text editing including arbitrary text search, text edition, insertions and deletions. Printout adjusts for line length number of lines per page, margins, automatic pagination, (if desired), line spacing and right margin justification. System allows user to "copy" or replicate blocks of text, creating new documents from standard paragraphs, or moving blocks of text to new postions within a document. Special user-defined function keys allow a single key to cause a much repeated phrase or sentence to be entered into a

document. Press the key and the phrase appears in the text.

System contains a directory for names and addresses allowing letters and envelopes to be printed and addressed to customers or clients, automatically. Custom changes to the system are available on special request. Two storage media are available; a tape cartridge in the unit or a separate disc storage version (allows greater document storage). Query vendor for full description of storage capacity and functional capabilities.

Power: 115 volts AC.

A speech box with sixty-four word vocabulary permits the system to spell verbally allowing blind typists or transcribers to compose, proof, correct and print documents accurately. Vocabulary consists of numerals and alphabet symbols for punctuation and upper and lower case letters. Speech box is activated whenever the cursor on the text display screen is positioned over a character. Desk top portable printer and disc drive device are separate.

Vendor: Maryland Computer Services Incorporated,
101 Thomas Street,
Bel Air, California 21014
Telephone (301) 838-8888

(Note: Although full description of the following two items is not available it would be useful to check each out.)

Audio Typing Unit: Similiar to talking word processing system.

Manufacturer: IBM

Apple 2E or Apple Computers: Check details regarding echo speech synthesis. Comparatively inexpensive.

LABELLING AIDS

These labellers may be used by a sighted co-worker to label things for a blind co-worker.

Large Print Labeller LPW 33:

Function: Embosses 1/2" high letters on 3/4" wide tape.

Employment application: Warehouse worker, stockroom clerk, storage depot, inventory personnel, and office and file personnel.

Description: This 3M Scotch brand labeller is a portable labeller that embosses large sharp letters and numerals (1/2" high on 3/4" tape). Ideal for persons with low vision. Can also be read tactually by blind persons with the knowledge of the print alphabet. Kit includes carrying case and four rolls of 3/4" tape, two vinyl and two magnetic.

Accessories: 3/4" wide dark blue polished finished tape; adhesive backing. Roll 288 inches long. May also order tape with magnetic backing. Permits reuse on steel surfaces. Roll 197 inches long.

Vendor: American Foundation for the Blind,
15 West Sixteenth Street,
New York, New York 10011
Telephone (212) 620-2170 for individual orders.

Orders from agencies, please phone (212) 924-2160.

In Canada, you may order from:
Canadian Institute for the Blind
1929 Bayview Avenue,
Toronto, Ontario
Telephone (416) 486-2500, ask for the Homecraft Department.

3M Braille Tape Writer BTW 400

Function: Embosses braille symbols on 1/2" tape for use as labels.

Employment application: Same as above.

Description: Embosses braille letters, numerals, punctuation signs and small words, as well as some braille contractions. The braille dial is easily interchangeable with the standard alphabet dial. Weighs 1 lb. 1/2" width vinyl, magnetic and aluminum tape is available.

Vendor: American Foundation for the Blind,
15 West Sixteenth Street,
New York, New York 10011
Telephone (212) 620-2170 for individuals.

Agencies should phone (212) 924-2160

In Canada phone:
CNIB,
1929 Bayview Avenue,
Toronto, Ontario
Telephone (416) 486-2500

LIGHT PROBES

These may be useful for persons who are required to detect specific lighting situations in order to determine certain types of information, examples will be included in the items listed below.

Active Passive Light Probe

Function: Detects light sources in the environment such as indicator lights on a multi-line telephone when used in the passive mode (no internal light source). In the active mode (with internal light source) measures amounts of light reflected from an object, for example distinguishing between different colour coded wires.

Employment application: Receptionists, secretaries and clerical staff who monitor calls on multi-line telephones; technicians, engineers, and scientists who monitor indicator lights on measuring equipment, and (in an approximate way and in the active mode) determine the position of needles on measuring gauges; electricians, technicians and other people working with electrical circuitry who need to distinguish between different colours of wires or other materials; typists who use this device to reinsert the page correctly and to check on ribbon condition.

Description: Light sensor and source are in a small, rectangular block at the end of a long,

flexible cable. Circuitry, controls, speaker and batteries are in the small box at the other end of the cable. When the light is detected the unit produces a tone whose pitch is proportional to the amount of light falling on the sensor. The higher the tone, the more light is being detected. Unit can also operate as an active light probe. It has its own light source and can, therefore, measure the amount of light from this source that is reflected by the object being examined. Controls include on/off switch, active/passive sensing switch and focus adjustment.

Power: Rechargeable batteries

Vendor: Smith Kettlewell Institute of Visual Sciences,
Rehabilitation Engineering Centre,
2232 Webster Street,
San Francisco, California 94115
Telephone (415) 563-2323

Amplifier Light Probes

Function: Permits the user to identify and locate a light source and to make subjective judgement about its intensity.

Employment application: Same as above.

Description: Vendor produces two models. The amplifier model consists of a pen-shaped light sensor connected to a 25" twisted wire cable and plugged into an input jack on a small box. The box contains a speaker, amplifier, battery and volume control. When the light

sensor is pointed towards a light source, the unit produces a buzzing sound; the brighter the light source, the higher the pitch of the buzz. Unit is a passive light probe only (no internal light source). Plastic case is easily opened to replace battery but manufacturer suggests a sighted person replace it to ensure internal wiring is not disturbed. Controls consist of a single on/off volume switch. The second probe, the three-way amplifier model has, in addition, an output jack permitting use of an earphone or a headset, allowing operation in one of three modes: speaker audio, earphone, or headset. The latter two automati-cally bypass the amplifier when the earphone or the headset is plugged in. Headset adapter may be installed only on a Plantronics Star headset. Headset adapter and earphone are included.

Power: Light sensor is approximately 4-1/2" long and 1/4" in diameter, weight 1/2 oz., Amplifier/speaker box is 3-1/2" long and 1-1/2" deep, weight 5-1/2 ozs. 9 volt transistor battery both models.

Vendor: Oregon Chapter No. 31, Telephone:
Pioneers of America,
421 S.W. Oak Street, Room 107,
Portland, Oregon 97204
Telephone (503) 242-8326

Audible Photo Conductive Light Probe 9432

Function: Detects status of telephone line indicator lamps and other indicator lamps on laboratory equipment; locates level of liquids in transparent containers; detects difference in light and dark materials.

Employment application: Similiar to that above, however, somewhat expanded to include the following. Scientists and engineers who monitor status lights on laboratory equipment; industrial, chemical, and food processing workers who monitor equipment status lamps or liquid level measurements (in transparent containers only).

Description: A hand held probe that converts light into tone output, the frequency of which rises in proportion to the intensity of the light, i.e., no sound in total darkness, a high shrill whistle under maximum illumination. It is shaped like a fat pencil with the photosensor, and lens located at the tapered end. The cap at the opposite and is a rotary on/off switch.

Power: Internal battery.

Braille and inkprint instructions are included. This is a short range instrument and is not intended as a guiding aid. Measures 5" inches length, 3/4" inches in diameter, weighs 3 ozs.

Vendor: Royal National Institute for the Blind,
224 Greatportland Street,
London, WIN 6AA, England.

Also sold by:
The American Foundation for the Blind,
15 West Sixteenth Street,
New York, New York 10011
Telephone (212) 620-2170

Audicator Black-White Colour Discriminator
T1 BW T1 ABW

Function:	Allows blind user to distinguish between levels of light reflected from objects. Light colours such as white produce a high tone, and dark such as black produce a very low tone. May be used to locate print, and letterhead, etc., on paper.
Employment application:	Same as above with the following additions. In the active (internal light source) mode, may determine the position of needles on gauges. Electricians, technicians and other people working with electrical circuitry may find it useful in distinguishing between different colours of wire or other materials. In general, the unit can be used in any situation where the position of an object or the relative amount of light reflected from an object must be determined.
Description:	Unit is a modification of the basic light sensing audicator T1 with a built-in black/white wire colour discriminator. Photosensor detects the amount of light reflected from an object. Self-contained light source is used for this purpose. The pitch of the tone produced by the audicator indicates the amount of light reflected. Other audicator accessories may also be used with this unit. Other model T1 BW. If user already has a basic audictor T1, order black/white wire colour discriminator only, model T1 ABW.
Vendor:	Science for the Blind Products, P.O. Box 120, Bala Cynwyd, Pennsylvania 19004 Telephone (215) 664-9429

Audicator Light Sensor T/1AS and T/1AP

Function:	Detects direction and intensity of light source. Determines status of indicator lights on telephones, measuring and testing equipment.
Employment application:	Same as other light probes.
Description:	Unit is an accessory to the basic audicator T1. Model T/1AS consists of a 3" long light sensor probe 3/4" in diameter located at the end of a 30" cable, permitting probe mobility while the audicator remains stationery. Model T1/AP plugs directly into the audicator. The entire assembly is then carried as a detector. The pitch of the audictor tone depends on the intensity of the light being scanned.
Vendor:	Science for the Blind Products, P.O. Box 120, Bala Cynwyd, Pennsylvania 19004 Telephone (215) 664-9429

Blind Probe

Function:	Detects the direction and intensity of light source; determines the status of indicator lights on telephones and measuring or testing equip-ment. Passive light sensor only (no internal light source).
Employment application:	Same as above.
Description:	A light probe in the shape of a wrist watch with a twist-o-flex wrist band. An 8" length of fibre optics used as a light pipe, extends from the wrist circuit towards the fingers. Unit has an earphone jack on the wrist unit,

immediately behind the light pipe. When the accessory earphone is plugged in the unit is turned on. When the light pipe is pointed at the light source, unit produces buzzing tone in the earphone; the brighter the light the higher pitched the tone. The unit can also be connected into a Plantronic Star telephone operators headset. Fibre optic light pipe can be cut to a shorter length to accommodate different hand sizes.

Power: Two internal hearing aid batteries. Wrist unit measures 1-1/2" by 1".

Vendor: Oregon Chapter No. 31, Telephone:
Pioneers of America,
421 S.W. Oakstreet, Room 107
Portland, Oregon 97204
Telephone (503) 242-8326

Dark Probe

Function: Indicates lights off condition, such as telephone indictor lamps on multi-line telephone systems.

Employment application: Telephone operators who must record length of time of timed telephone calls; others who need positive indication when indicator lights on equipment are turned off.

Description: Two prototypes have been built: A single probe version and double probe model. System consists of a small box with circuitry and a speaker as well as photosensor probe or probes at the end of the cable(s). Each probe also has a suction cup to hold it in place over an indicator lamp. The probe is silent when the sensed indicator lamp is on. When no light is sensed, the speaker emits a

contant tone. The two probe model emits two distinctive tones and has a switch to select a constant tone or a beeping tone output. Has on/off switch and volume control, tone switch on the two probe model only.

Power: Internal battery.
Single probe box measures 1" by 2" by 3".
Double probe box measures 2" by 3" by 5".

Vendor: Smyth Kettlewell Institute of Visual Sciences,
Rehabilitation Engineering Centre,
2232 Webster Street,
San Francisco, California 94115
Telephone (415) 563-2323

Light Sensor 1-0850

Function: Light sensor device detects direction and intensity of a light source, and the status of indicator lights on telephones and measuring or testing equipment. Passive light sensor only (contains no internal light source).

Employment application: Similiar to those listed above. It also has been used in conjunction with an exterior light source to determine the level of liquids in a large plastic container.

Description: Rectangular box has light sensor mounted in circular tube at one end of the unit. Speaker within unit produces tone which varies with the amount of light. The brighter the light source, the higher the tone. Unit has on/off switch.

Power: Battery operated. Unit is a box 3-1/2" by 2-1/2" by 1-1/2" tube with light sensor is 1/2"

in diameter and 3/4" in length.

Vendor: American Printing House for the Blind,
P.O. Box 6085,
Louisville, Kentucky 40206
Telephone (502) 895-2405

Optical Probe

Function: Detects on/off status of lights such as telephone switchboard lights. Emits audible tone dependent on light intensity.

Employment application: Same as above.

Description: Has a photosensor in one end. Small speaker emits tone whose frequency is proportional to the intensity of the light source being examined. Compact unit approximately the size of a pen flash light.

Power: Internal battery.

Vendor: J.C. Swail, Medical Engineering Section,
Electrical Engineering Division,
National Research Council of Canada,
Ottawa, Canada K1A OR8

Print Locator & Light Detector MC 900

Function: In one mode can determine position of print on a page by emitting tone which varies in frequency with the amount of light detected by the photosensor. A flip of a switch converts the unit to a light detector.

Employment application: Same as above.

Description: Solid state unit contains a light source and a light sensor. Produces an audible output which varies with the amount of light detected by the photosensor. The more light detected by the photosensor, the higher the frequency of the output. Switch allows light source to be turned off so unit can be used as a light probe. Unit has jacks for battery charger and earphone. Cassette containing training instructions is included.

Power: 2AA pen light batteries.
Unit measures 4" by 3" by 1-1/2", weighs 4 ozs.

Vendor: American Foundation for the Blind,
15 West Sixteenth Street,
New York, New York 10011
Telephone (212) 620-2170

Sono Beam Light Probe

Function: Detects status of telephone line indicator lamps, other indicator lamps and laboratory equipment. Detects difference in light and dark materials and can distinguish print on paper.

Employment application: Same as above.

Description: This light probe is the size of a cigarette lighter.

Power: 9 volt battery.

Vendor: IRTI,
375 Distel Circle, Suite C4,
Los Altos, California 94022
Telephone (415) 965-8102

LIQUID LEVEL INDICATORS

Audicator Liquid Level Indicator T1

Function: Allows user to detemine when liquid has reached a specified level in a container without the user physically touching the liquid.

Employment application: Chemists and technicians who work with corrosive or toxic substances; vending stand operators, restauranteurs, food service personnel where hygiene is obligatory.

Description: An accessory to the audicator T1 light probe. It clips on the side of a container. Two electrodes are attached to the bottom end of the accessory. Unit can be adjusted to different depths inside the container. When liquid comes in contact with the terminals the audicator emits a tone. Models for home and laboratory use have been developed. The laboratory model T1ALL is 10" in length. A fixed level indicator is available for use in vending stands, or other uses you may feel appropriate.

Vendor: Science for the Blind Products,
P.O. Box 120,
Bala Cynwyd, Pennsylvania 19004
Telephone (215) 664-9429

Liquid Level Indicator

Function: Determine levels of liquid in a container when probe comes in contact with liquid. Allows user to pour liquid into containers without fear of overflowing.

Employment application: Chemists, lab technicians, industrial workers, restaurant and food service workers where hygiene is important.

Description: Has two small electrodes which act as liquid sensor. Speaker produces tone when liquid reaches the electrodes.

Power: Internal battery.
Approximate size of a pen flash light.

Vendor: J.C. Swail, Medical Engineering Section,
Electrical Engineering Division,
National Research Council of Canada
Ottawa, Canada K1A OR8
Telephone (613) 993-2482

Auditory Cup

Function: Allows user to measure specific amounts of liquid in this cup without fear of overflow or excess liquid being placed in the cup.

Employment application: Same as those above.

Description: Cup indicates liquid levels, by different tones for each. The following amounts are indicated by different tones on the cup. 1/4 cup, 1/3 cup, 1/2 cup, 2/3 cup, 3/4 cup, 1 cup and 1-1/4 cup. Useful for any employment situation in which frequent and precise pouring is required.

Power: 9 volt battery.

Vendor: IRTI,
375 Distel Circle, Suite C4,
Los Altos, California 94022
Telephone (415) 965-8102

MEASUREMENTS: ELECTRICAL

Audicator T1

Function: Accessories for the audicator allow it to operate as a light probe (T1AS, T1AP), liquid level indictor (T1ALL), continuity tester (Clip leads-T1AC), or black/white wire discrimintor (TABW). These functions are discussed in more detail under appropriate catalogue subject headings, or query vendor.

Employment application: Depending on accessories ordered, can be used by switchboard operators, electricians, electronics technicians, assemblers, engineers, scientists, etc.

Description: Consists of a small black box which emits tone when its circuit is complete. Uses are determined by listed accessories. Unit contains battery, on/off switch, and speaker. Frequency of the tone emitted by the device depends on the amount of current detected by the unitis circuitry.

Power: Replaceable batteries.
Order includes one accessory. Accessories available include T1AC clip leads, T1ALL liquid level indictor, T1AS light sensor on cable, T1AP lug-in light sensor and T1ABW black/white wire colour discriminator.
Measures 3" by 1" by 2".

Vendor: Science for the Blind Products,
P.O. Box 120,
Bala Cynwyd, Pennsylvania 19004
Telephone (215) 664-9429

Audilux and Accessories

Function:	Accessories allow the Audilux unit to operate as a light probe in both active (light sensing reflected from internal lamp source) or passive (sensing ambient light only) modes. A continuity tester for resistor, capacitors or diodes; a liquid level sensor; and a signal tester.
Employment application:	Depending on the accessory used, the unit can be used by telephone operators, receptionists, and secretaries who monitor multi-line systems; electronics technicians, assemblers, engineers and scientists who use test equipment and check circuits; restaurant workers, chemists or other industrial workers measuring or pouring liquids.
Description:	A small box with probes or test cable attachments. Output in the form of an audible tone. Frequency of tone is proportional to the resistance across two contacts. Accessories allow this unit to perform tasks such as monitoring status of flashing or on/off lights, checking the intensity of electrical circuits, acting as a liquid level sensor or a signal sensor.
Power:	Battery operated.
Vendor:	Deutsch Blindenstudienanstalt, AN SCHLAG 8 D-355 Marburg/Lahn, West Germany

Continuity Testor

Function:	Tests diodes, resistors, electrolytic, switches, fuses, other electrical circuits.

Employment application: Engineers, technicians, appliance repair persons, radio and television repair persons, electronics assemblers.

Description: The circuit being tested is connected to the unit with clip leads. A small speaker produces a tone, the frequency of which is proportional to the resistance of the circuit.

Power: Internal battery.
Compact unit is approximately the size of a pen flash light.

Vendor: J.C. Swail, Medical Engineering Section,
Electrical Engineering Division,
National Research Council of Canada,
Ottawa, Canada K1A OR8

Audicator T1AC

Function: Measures continuity of a component or circuit by emitting a tone. Level of resistance in circuit under test is indicated by pitch of audicator tone. Unit can also determine polarity of diodes and electrolytic capacitors.

Employment application: Electronic technicians, assemblers, electricians, engineers and scientists for a variety of simple testing procedures.

Description: Basic audicator T1 unit, plus set of clip leads (see Audicator T1).

Vendor: Science for the Blind Products,
P.O. Box 120,
Bala Cynwyd, Pennsylvania 19004
Telephone (215) 664-9429

Talking Frequency Counter

Function:	Provides a voice-output counter for precise measurements of frequency.
Employment application:	Allows blind engineers and technicians to independently measure frequency of transmitters, oscillators, and other electronic equipment. This equipment is necessary for performance of most technician-type jobs. The talking frequency counter is also useful for ham radio operators.
Description:	The talking frequency counter is a modified MAX 100 counter produced by Continental Specialties Corporation. It permits accurate frequency measurements of Hz20 to Hz100. When the unit is connected to the signal to be measured, the counter will automatically lock onto the incoming signal. When the talk button is depressed the last frequency displayed on the 8-digit display will read out in voice digit by digit. Other features include lead 0 blanking, cancel button to stop the voice during readout, overload protection, and automatic decimal point readout.
Power:	Battery operated. Measures 1-1/4" by 5-1/4" by 7-3/4", weight 1-1/2 lbs.
Vendor:	Telesensory Systems Incorporated, 3408 Hillview Avenue, Palo Alto, California 94306 Telephone (415) 2626

Aud-a-Zilch T/18

Function:	Detects imbalance in DC impedance bridge circuit; services as substitute or test amplifier in AC circuits.
Employment application:	Electrical engineers, scientists, technicians, circuit assemblers.
Description:	Consists of a detector circuit that drives a speaker, which emits a tone. When the circuit under test is balanced, the tone stops. Amplifier in unit may be used for testing AC circuits or balancing AC bridges. Controls include switch to select null detector or amplifier. Unit comes with clip leads.
Power:	120 volts AC. Measures 1-1/4" by 2-1/2" by 3".
Vendor:	Science for the Blind Products, P.O. Box 120, Bala Cynwyd, Pennsylvania 19004 Telephone (215) 664-9429

Impedance Bridge T-6

Function:	Measures AC and DC resistance, capacitance, inductance, and storage and dissipation factors in electrial circuitry.
Employment application:	Electrical engineers, laboratory technicians, and persons performing auto mechanics and home appliance repairs.
Description:	A standard Heath kit impedance bridge or a general radio rebuilt second hand bridge, which has been adapted for use by blind persons. A tone is emitted until a pointer

is adjusted to the correct value of the parameter being measured. This value is read from a braille scale surrounding the pointers. Unit has accurancy of 3% for resistance and capacitance, 10% for inductance, and 20% for storage and dissipation factors. Cassette containing instructions is included.

Vendor: Science for the Blind Products,
P.O. Box 120,
Bala Cynwyd, Pennsylvania 19004
Telephone (215) 64-9429

Meter, Aud-A-Meter T-7/T-7P

Function: Pemits reading of a variety of DC meters that have analog (moving needle) display with external meter movement terminal posts, allowing connection of Aud-A-Meter unit. Eliminates need for special adaptation for meters.

Employment application: Electrical engineers, laboratory technicians, radio station workers, repair persons for electrical equipment, and anyone who must work with a meter that has an analog display; especially valuable where blind person must use a variety of meters.

Description: Has a pointer knob with surrounding tactile scale. Can be connected to terminals of the analog meter display DC meters, which have meter movement voltage of 150 millivolts full-scale. When connected to a meter, unit produces a tone until pointer is adjusted to correct reading.

Model T-7P can be connected to four different meters at once. A selector switch allows

operator to read one meter at a time, (the values which the tactle marks represent vary depending on the meter being read). Unit is a plastic box, 6" x 4" x 2".

Vendor: Science for the Blind Products,
P.O. Box 120,
Bala Cynwyd, Pennsylvania 19004
Telephone (215) 664-9429

Meter, Aud-A-Simpson T11

Function: Measures DC and AC voltages, DC current and resistance of DC electrical circuits and components.

Employment application: Scientists, engineers and technicians; including quality control, assembly and repair personnel. Requires using hands to adjust pointer and read tactile markings during measurements process.

Description: Modification of standard Simpson Model 260 Multimeter (volts, milliamps, and ohms). Normal scale has been removed and replaced by circular scale with tactile markings and a knob with a pointer at scale's centre. As long as pointer is not indicating correct value of measurement, unit produces a buzzing tone from a small speaker. When correct value is reached, tone disappears. Value can then be read from braille markings on the scale. Unit has impedance of 20,000 ohms/volt DC and 5,000 ohm/volt AC.

Total of 27 ranges available; DC volts: 8 ranges from 0 - 0.25 up through 0 - 1,000 volts; AC volts: 6 ranges from 0 - 0.25 up through 0 - 1,000 volts; DC volts: 6 ranges from 0 - 50 microamps, 0 - 1 milliamps up to

0 - 500 milliamps, and 0 - 10 amps; resistance: 3 ranges, RX1; 0 - 2000 ohms, RX100; 0 - 2000 K ohms, and RX 10,000; 0 - 20 megaohms; accuracy, 2-1/2%. Comparable to multimeters available to sighted users.

Controls include on/off-switch, function selector, range selector, and reset button to prevent overloading of circuits when measured signal exceeds selected range. Comes with a pair of screw-on clip leads which can be used either as test probe or alligator clips.

Vendor: Science for the Blind Products,
P.O. Box 120,
Bala Cynwyd, Pennsylvania 19004
Telephone (215) 664-9429

Meter, Audible Multimeter TS 282

Function: Measures DC voltage, current, or resistance, and provides accurate tactile readout. Optional accessories permit measurement of AC and off-voltages.

Employment application: Scientists, engineers, technicians including performance of quality control, electronic assembly, and repair operations. Reading the meter requires using hands for turning the pointer and reading tactile dial.

Description: Meter has analog readout which is obtained by turning pointer until sound signal (from built-in speaker or headphones), disappears (is nulled out), then reading the tactile markings on the dial. Meter is comparable in range and accuracy to counterparts for sighted persons. Incorporates multi-range

100,000 ohms/volt DC voltmeter, precision bridge-type ohm meter and DC millimeter. Accuracy better than 2-1/2%.

Available in following ranges: voltage from 01 through 0500 volts; current from 0-0.1 microamps through 0-1 Amperes and resistance, from 0-1 ohms through 0-10 megaohms. Large raised scale has ten major divisions marked by double, raised dots; mid-points between major divisions, marked with single dots. Controls include power/polanty switch, range selection switch, and function selection switch. All solid-state circuitry. Headphones may be used but are not included.

Power: Replaceable batteries.

Vendor: American Foundation for the Blind,
15 W. 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Meter Reader, Auditory

Function: Converts output of DC analog (moving needle) meters to tone that nulled out when correct meter reading is set on dial.

Employment application: Scientists, engineers, electronic technicians, other who use DC analog meters.

Description: The box containing circuit, calibrated potentio-meter with adjustment knob and speaker, connects to any analog DC meter such as Heathkit or Simpson meter; produces a tone output until user adjusts the knob which nulls out the tone. At this point, the meter

measurement value can be read from the braille scale around the knob. Controls include an on/off switch and a calibrated potentiometer with user/adjusted knob. A second version has a tone lead out that increases in tone frequency until knob reading matches meter reading, emitting its highest pitch at this point. This unit is useful for noisy environments.

Power: 110 volts AC.
May use power supply with the meter itself if one meter movement terminal is common ground. Prototypes have been built into instruments or are contained in a box.

Vendor: Smyth Kettewell Institute of Visual Sciences,
Rehabilitation Engineering Centre,
2232 Webster Street,
San Francisco, California 94115
Telephone (415) 563-2323

Meter Reader, Speech Output

Function: Converts reading of analog (moving needle) multimeter to verbal output on command; indicates rapidly changing voltage values by simultaneous changes in a tone output; stores and reads out on command the peak meter reading of a measurement.

Employment application: Scientists, engineers, technicians, electronic assemblers, others who use analog meters in test or quality control situations.

Description: Attaches to analog meters that have accessible meter movement terminals. When user presses speak key, the tone is silenced and it responds with a verbal readout to the

meter value. The device samples the meter value twenty times per second and stores the highest value recorded. If the user presses the peak recall key, it verbally responds with the peak reading. A sequence of 100 distinct tones ranging from Hz 40 to Hz 5,000 indicates changes of the meter reading in increments of one percent. For fluctuating meter readings, the tones change similar to a melody played on a piano. Higher tones correspond to higher meter readings. The user does not have to use his or her hands to read this instrument, as is the case with tactile indicators, or tone setting devices. Hands are there to adjust circuits or equipment under test. Controls consist of an on/off switch and a volume control for the speech and tone output. A continuous speech switch disables the tone and repeatedly, verbally reports the meter reading. A speak peak switch, and a clear peak, control the peak reading system.

Power:

110 volts AC.

Options include report only on voltage change. When this switch is on, the unit will be silent until the input voltage changes, whereupon, will report new reading and then remain silent until another change in the input occurs. Quiet on zero input voltage: when this switch is on and the input voltage is zero, the output tone will be wired off. As soon as the input moves from zero, the tone will come on and follow the voltage changes. This quiets the lone output when measurements are not being made.

Alarm Trip Points:

From one to three different alarm levels can be designed into the system. When activated

by the appropriate switch, the unit will remain silent until the corresponding set point is reached, whereupon, it will enunciate the voltage reading. The input reading will continue to be verbally reported as long as the voltage remains above the trip point. Unit measures 10" x 8" x 3". Weighs approximately three pounds.

Vendor:

Larry Waldron, Wespro,
4442 Casson Road,
Syracuse, New York 13215
Telephone (315) 469-7182

Oscilloscope Auditory

Function:

Converts cursor position on CRT screen to audible tone which varies with position.

Employment application:

Scientists, engineers, electronics technicians, personnel who test circuits or instruments.

Description:

The system consists of three parts. The first is a commercially produced oscilloscope. The second section is a circuit containing a calibrated slide (linear-motion) potentiometer and associated circuitry. The third is the audio/oscillator circuit and speaker. The input signal to the oscilloscope is presented such that the ordinate (vertical) information is used to vary the frequency for the audio-oscillator. The pitch of the audio tone rises and falls for corresponding positive and negative excursions of the ordinate information. The abscissa (horizontal) information is presented by means of a manual scan using the potentiometer. The slide on

the potentiometer serves as an electrical, horizontal position referencing control. In operation, the user moves this slide laterally while listening to the variable-frequency audio-oscillator as it describes the ordinate information. The users can quickly learn the characteristic sounds made by sine waves, square waves, and other repetitious signals. The unit can also measure the amplitude of any status display. Controls consist of the slide position on the linear potentiometer, an on/off switch and volume control for the speaker.

Vendor: Smyth Kettlewell Institute of Visual Sciences,
Rehabilitation Engineering Centre,
2232 Webster Street,
San Fancisco, California 94115
Telephone (415) 563-2323

Power Indicator T-9

Function: Used to test circuitry when changing fuses or resetting circuit breakers. Sounds can still be heard when user is making adjustments elsewhere.

Employment application: Electricians, construction workers, building maintenance personnel.

Description: Consists of a buzzer that can be plugged into a standard electrical wall socket; buzzing tone indicates live socket. Intensity of sound is proportional to the voltage available in the socket. Unit produces a clicking sound if DC volt is present.

Vendor: Science for Blind Products,
P.O. Box 120,
Bala Cynwyd, Pennsylvania 19004
Telephone (215) 664-9429

Recording Level Indicator

Function: Monitors the level of input signals into a tape recorder. A warning tone indicates that the input signal level is too high, causing distortion in a recording. Can be used in stereo or monaural recording.

Employment application: Broadcast station engineers or announcers; recording studio personnel.

Description: Connects to monitor jack of recording equipment. Small speaker produces tone if volume level of recording exceeds the proper level. Pitch of the tone is proportional to the degree to which recording volume exceeds proper level. Varying pitch level allows rapid adjustment of equip-ment. More sophisticated professional models with additional control features are also available. Consult vendor.

Power: Internal battery.
Measures approximately 1-1/4" x 2" x 3".

Vendor: J.C. Swail, Medical Engineering Section,
Electrical Engineering Division,
National Research Council of Canada
Ottawa, Ontario K1A OR8

Recording Level Monitor Aud-A-Level T10P

Function: Monitors audio level of monaural and stereo tape recorders during recording or

broadcasting. Emits audible buzzing output when recorded signal is too strong.

Employment application: Radio broadcasting engineers and controllers; recording engineers or technicians.

Description: Connect to recording monitor jack of tape recorder. Requires recorder output signal of 350 milliwatts or greater; 1,000 ohms maximum output in impedence; input in impedence 10,000 ohms calibrated with switch for setting at zero. BU - minus fifteen, minus ten, minus five, minus two, zero, plus two, plus three; selector switch for operation at plus four and plus eight may be used; handles balanced or unbalanced input without degradation of calibration; built-in stereo switch.

Power: 120 volts DC.
Measures approximately 4" x 3" x 1-1/4".

Vendor: Science for the Blind Products,
P.O. Box 120,
Bala Cynwyd, Pennsylvania 19004
Telephone (215) 664-9429

MEASUREMENTS: PHYSICAL

Angle Divide TC 189

Function: Measures angles, especially in an object that has already been built (for example the angle in a cabinet; into which a shelf must be fitted) It is particularly useful in situations where a protractor cannot fit.

Employment application: Carpenters, cabinet makers or other workers.

Description: Main shaft of unit is 7-3/8" long, 6-1/2" long blades pivotted at one end, of the main shaft and are in turn connected to a slide which moves up and down a slot in the main shaft. Scale at left side of the shaft has grooves that can be read tactually to measure in between 45 degrees and 60 degrees at separation between the blades. The second scale at right side of the shaft can be read tactually for setting blade at the correct angle for cutting 4, 5, 6, 8, or 10 sided poly-gons. Unit also has removable straight edge, machined to serve as a tri-square. Weight 1 lb.

Vendor: American Foundation for the Blind,
15 W. 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Caliper Rule Stanley 205

Function: Measures inside or outside dimensions of objects which can be held in or against its jaws.

Employment application: Carpentry or construction trades.

Description: Has two main parts: a sliding jaw, and a body or stationary jaw. The sliding jaw has a raised scale graduated in 1/8" markings indicted by a single raised dot. For quick reading, the 1/2" mark has two raised dots and the 1" mark has three raised dots. The stationary jaw has two raised dots on the face; outside measurements are made by placing an object between the jaws, closing them against it and reading the scale tactually against the upper dot. Inside measurements are made by placing the tin tip

of the stationary and sliding jaws inside the object and then tactually reading the scale against the lower dot. Weight. 3 ozs.

Vendor: American Foundation for the Blind,
15 W. 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Calipers

Function: Measures interior or exterior physical dimension or depth of an object with reasonably good precision.

Employment application: Machinists, mechanics, engineers, scientists, auto repair persons, some workers in building trades; used when rapid measurement of dimension is required with reasonable close precision. High precision measurements require the use of a micrometer.

Description: Unit is a standard set of Bernier Calipers, adapted for tactile reading. It consists of two arms pivoted at one end. To measure, arms are opened to touch the part being measured. Pointers are on each arm at the pivoted end. When the arms have been opened to correct distance, the number of markings on the circular dial between the two pointers indicates the distance being measured. Pointers have raised dots every 10 or 15 millimeters; deepened notches correspond to the 1 mm intervals. Range is 0-150 mm. Available in metal or plastic versions. Query vendor for full description, and for catalogue containing the other measurement variables and the employment aids.

Vendor: Deutsche Blindenstudieanstalt, AN Schlag,
8 D-355, Marburg/Lahn,
West Germany

Digit-Cal (R Talking Caliper TTF 5360)

Function: Permits rapid, accurate measurement of size for inside, outside, step or depth measurements.

Employment application: Machinists, lab technicians, scientists, engineers, draftspersons, and workers who must make reasonably accurate measurements rapidly.

Description: A product of the American Foundation for the Blind (AFB) voice technology. Allows Browns and Sharp's calipers to speak. It offers new employment opportunities for persons with visual disabilities. Four precision measurements can be taken; inside, outside, depth and step. Can be set for absolute or comparative readings. Voice box is easily attached and leaves hands free for work. Voice module attached to long cable. The caliper speaks continously, or when button is depressed, depending on switch selection. Excellent for quality control and component checking.

Power: Rechargeable batteries.
Provide 8-10 hours of operation. AC operation with AC/DC charge adaptor.

Vendor: American Foundation for the Blind,
15 W. 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Dial Indicator, Electronic with Audio/Tactile Adaptation

Function:	Indicates position of various moving carriages on lathes and milling machines; compares measurements of pre-set tolerances.
Employment application:	Machinists, drill press, milling machine, and lathe operators working with a variety of power tools. Lathe operators can use the device to centre a piece of material in a four jaw chuck. When holes of varying depths must be drilled in a piece of material, the dial indicator can greatly speed up the process.
Description:	Consists of two parts: a box containing the electronics and gauge, and a Schaeditid Incorporated instrumentation probe with a removable rod at one end that senses the displacement of the object being measured and generates an electrical signal. The signal is received in the audible circuit, which activates three readouts. The first is a pointer knob which, when turned, causes the speaker to emit a tone that increases in pitch until the measured value is reached. The user then reads the value on the Braille scale around the pointer knob, which is calibrated in 1/100ths of an inch increments. The second readout uses the same pointer knob, but allows the tone to be nulled out when the measured value is reached. The third readout consists of two dials with braille scales which are present for plus and minus tolerances of the first measurement. If either tolerance setting is exceeded, the appropriate alarm emits a distinctive tone. Probes come in differing ranges. Controls consist of an on/off power switch, two switches for operating the upper

and lower tolerance indicators, and a fine zero control to correct zero offset. Unit has an earphone jack.

Power: 110 volts.

Box with circuitry measures 10" x 12" x 3". Probe measures approximately 1" in diameter, 8" in length.

Vendor: Smyth Kettlewell Institute of Visual Sciences,
Rehabilitation Engineering Centre,
2232 Webster Street,
San Francisco, California 94115
Telephone (415) 563-2323

Level Carpenter's 9411

Function: Determines if a horizontal surface is level; measures the amount the surface deviates from the horizontal.

Employment application: Carpenters, cabinet makers, other woodworking applications. Used in the construction and adjustment of surfaces which must be level and which have small grade angles, such as counter tops on drain boards.

Description: A steel trough holds a ball bearing about one inch in diameter. If unit is level, ball will not move. If unit is off level, ball will roll to one end of the device. A knob at one end of the trough can be turned to raise or lower that end until the device has been brought into level. The amount of adjustment required indicates the degree to which the surface is off level. Measures 10" x 1-1/4" x 1-1/4". Weight, two pounds.

Vendor: Royal National Institute for the Blind,
224 Great Portland Street,
London, England

Level Carpenter TS 274

Function: Determines if a horizontal surface is level. Measures amount the surface deviates from the horizontal.

Employment application: Carpenters, cabinet makers, other wood-working applications.

Description: A piece of 3/4" angle iron with a 7/8" steel ball lying in the angle, welded at one end of a metal plate, supported by a pin. One end of the angle can be raised or lowered by turning a calibrated screw. Each turn of the screw changes the level of the unit by 1/2 degree. When the unit is level, the steel ball rolls freely within the angle. A retaining rod assembly prevents the steel ball from falling out of the unit.

Vendor: American Foundation of the Blind,
15 West 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Level, Electronic TM 568

Function: Provides accurate horizontal or vertical levelling, comparable to spirit levels used by sighted workers.

Employment application: Carpenters, construction workers, and other persons requiring a level.

Description: Aluminum unit produces an audible tone which stops when unit is level or is vertically aligned. Supplied with replaceable nine volt batteries. Length two feet, weight two pounds.

Vendor: American Foundation for the Blind,
15 West 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Micrometers

Function: Measures dimensions with high accuracy.

Employment application: Engineers, scientists, mechanics, technicians, machinists or others needing to make precision measurements.

Description: A stand-type micrometer: the object to be measured is placed on the base and the knob turned until the upper jaw of the micrometer is in contact with the top of the object being measured. As the micrometer is adjusted, a pointer rotates on a large circular dial to indicate the current of the interior. The dial has two dots at 0.1 millimeter intervals and one dot at .05 millimeter intervals, and deepened notches at .01 millimeter intervals, to allow a blind person to read the value indicated by the pointer.

Vendor: Deutsche Blindenstudieanstalt, An Schlag 8,
DC 355, Marburg/LAHN,
West Germany

Micrometer - Braille

Function: Provides braille readout for standard micrometer.

Employment application: Same as above.

Description: Consists of a standard micrometer modified for braille readout. The anvils of the frame (C type closed jaws) have a pointer arm attached on the end nearest the scale, mounted parallel with the spindle. The pointer arm is grooved at intervals corresponding to measurement intervals desired for a particular unit. On the spindle handle (thimble), a large wheel is mounted which turns on the spindle as it is adjusted to close the anvils on the measured object. The wheel has a braille tape scale on it. As the spindle turns, the groove indicates the number of turns of the spindle, at a 0.025 per turn. The braille markings are read against the pointer. Micro-meters of various ranges may be constructed using this principle.

Vendor: Smyth Kettlewell Institute of Visual Sciences,
Rehabilitation Engineering Centre,
2232 Webster Street,
San Francisco, California 94115
Telephone (415) 563-2323

Micrometer Break Drum

Function: Measures inside diameter of break drums and amount of wear on break drums.

Employment application: Mechanics and machinists working in auto-repair shops or facilities specializing in break repairs.

Description: Consists of a bar with two moveable arms attached. The arms are separated to the distance specified by the break drum manufacturer, locked into place with thumb screws, then inserted into the break drum. At the end of one arm is a circular dial approximately two inches in diameter. A pointer on the dial indicates the separation between the arm and the inside edge of the break drum. The dial indicates the amount by which the break drum differs from the manufact-urer's specifications. Measures break drums from 6-1/2" to 15" in diameter. The bar also has notches cut a 1/8 inch intervals. The dial is marked with three dots at each plus 03 degree mark, two dots at each plus 01 degree mark, and one dot at each plus 0.005 mark and minus 0.005 mark. Measures approximately 15-1/2 inches in length.

Vendor: Smyth Kettlewell Institute of Visual Sciences,
Rehabilitation Engineering Centre,
2232 Webster Street,
San Francisco, California 94115
Telephone (415) 563-2323

Micrometer Electric Dial with Audio Tactile Readout

Function: Converts analog (moving needle) meter readout of commercial dial micrometer to tuned tone output with calibrated braille scale.

Employment application: Machinists, quality control personnel testing tolerances of machined parts; others who make precision measurements.

Description: Consists of an audio-tactile meter reading device, connected to a commercially produced electronic micrometer with analog readout. The commercial unit reads the micrometer probe position on its analog meter. These units are available in a number of measurement ranges and probe styles. The audio tactile meter reading device is attached to the commercial unit through an available jack. The device has two readouts. 1. A pointer knob which, when turned, causes the speaker to emit a tone which increases in pitch until the measured value is reached. The user then reads the value on the braille scale around the pointer knob. 2. Two screwdriver adjustments that are preset from the commercial unit for plus and minus tolerances of the first measurement. If a measured value is out of tolerance, the adapted unit sets off high or low tone auditory alarms for high or low tolerance excess, respectively. Controls include on/off switches and volume for both readouts, and pointer knob (which is a calibrated potentiometer) and a braille scale. The commercial unit has a switch to change the scale of the auditory readout box to one of two analog gains.

Power: 110 volts AC, also internal battery for portable use.

Vendor: Smyth Kettlewell Institute of Visual Sciences,
Rehabilitation Engineering Centre,
2232 Webster Street,
San Francisco, California 94115
Telephone (415) 563-2323

Micrometer Starrett

Function: Provides accurate measurement of objects placed in its jaws.

Employment application: Same as above.

Description: Standard Starrett micrometer modified for finger nail reading. Graduations on thimbles have been deepened and raised dots have been added. In the sleeve, all graduations are deepened. 0.100 graduations appear only over the zero line. The 0.050 markings are carried below the zero line, while the 0.025 and 0.075 markings appear above the zero line. Thus the operator can quickly determine in which .025 division the measurement falls, and can then determine the final measure-ment within 1/1,000". There are no numeral markings.

Vendor: American Foundation for the Blind,
15 W. 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Micrometer, Starrett Depth TM 210

Function: Measures depths or distances where the conventional micrometer will not work, such as car cylinders, pipes, etc.

Employment application: Used by workers who need precise measurements, distances, or interior dimensions - machinists, mechanics, engineers.

Description: Modification of the standard Starrett micrometer for finger nail reading. Graduations on thimble have been deepened and raised dots have been added. On the sleeve, all graduations are deepened. Accuracy can be measured within 1/1,000". There are no numeral markings. Weight 1-1/2 lbs.

Vendor: American Foundation for the Blind,
15 W. 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Micrometer, Starrett Hub

Function: Provides precision measurement of dimensions where the micrometer must be inserted into a small opening such as measuring the length of a hub of a journal bearing. Where the micrometer must be passed through the opening in the bearing in order to make this measurement.

Employment application: Machinists, mechanics, technicians and workers requiring precise measurements.

Description: Adaptation of standard micrometer for use by the blind. Graduation lines have been deepened, and raised markings added for tactile reading. Accuracy of 0.001 inches.

Vendor: American Foundation for the Blind,
15 W. 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Micrometer, Starrett Inside TM 526 & TM 527

Function: Provides precise measurements of interior dimensions, such as the diameter of a car engine cylinder or the inside diameter of a pipe.

Employment application: Machinists, mechanics, engineers, technicians, who are required to make precise measurements.

Description: Has a barrel similar to that of the standard and depth micrometers. It also has deepened grooves and raised lines for tactile reading of measurements, incorporating the same system described for the Starrett micrometer. Model TM 526 range is inches 0.200 to inches 1.200. Model TM 527 range is from 1 inch to 2 inches with an accuracy of .001. Each unit weighs 8 oz. Braille instructions available on request.

Vendor: American Foundation for the Blind,
15 West 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Micrometer, Starrett Mul-T-Angle

Function: Used to measure dimensions in unusual configurations, such as the thickness of tubing walls or distance from a slot to edge of a block of material.

Employment application: Machinists, mechanics, and technicians who need to make accurate measurements.

Description: Adapted for tactile reading by deepening of grooves and the addition of raised markings. Interchangeable rod and flat

anvils are provided with unit. Accurate to within .001 inches. Model TM 630, range from 0 to 1 inch. Model TM 632 range 1 to 2 inches.

Vendor: American Foundation for the Blind,
15 West 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Protractor and Saw Guide TM 204

Function: Allows a blind person to saw through wood at an angle with reasonable precision.

Employment application: Carpenters and other wood workers.

Description: 9-1/2" radius protractor with a raised dot tactile markings every 5 degrees, double dots at 30 degrees and 60 degrees and triple dots at 0 degrees. A 9-3/4" long, 1-1/2" wide arm pivotted at the centre of the protractor base can be adjusted to the proper angle and locked into position with a thumb nut. The arm has a pointer which travels over the scale of the protractor. A straight edge extends 18" to the left of the protractor. The pivotted arm is aligned against the edge of the wood and the protracter is adjusted to the proper angle. When it has been locked into place, the straight edge extending from the base of the protractor, provides a guide for the saw. Made of aluminum-plated steel. Weighs 1-1/2 lbs.

Vendor: American Foundation for the Blind,
15 West 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Rotomatic Rule T 78

Function: Measures distances from 0 to 680 to an accuracy of 1/64th of an inch. Permits repeated measurement of fixed distance.

Employment application: Woodworkers, carpenters, machinists, and mechanics.

Description: Consists of a 6 inch piece of 3/8th inch diameter aluminum rod threaded to 16 threads per inch. One side of the rod has been milled flat and the opposite side has tactile markings every half inch. Rectangle nut with tactile pointer is on the rod. Pointer is opposite tactile markings when nut is at zero. As the nut is rotated and backed away, each 1/4 turn represents an additional 1/64th of an inch. A locking nut sets and holds any dimension. One end is threaded to receive extension rods. Weight 8 oz. Braille instructions available on request. Accessories include 6 inch extension rods TS 159 and 12" extension rods.

Vendor: American Foundation for the Blind,
15 West 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Telescopic Click Rule

Function: Measures length from 0" to 12" and produces click at each 1/64th of an inch.

Employment application: Woodworking trades such as carpentry, and other fields, where click measurements of lengths several inches are required.

Description: Anodized aluminum rule which clicks at each 1/16 of an inch and has raised graduations at each 1/2 inch. The rule itself slides into a 7-5/8" housing and is fitted with a knurled locking screw that rides along a slot in the housing. Six inches from the starting end is a shoulder 1/4" thick which allows inside measurements from 6-1/4 inches to 12-1/4 inches to be made. Depth measurements up to 6 inches, and outside measurements up to 12 inches can be taken accurately to within 1/16 of an inch. The outer end of the slide is spread to receive two 1 foot extension rods which are included for use as 2 or 3 foot rules. Weight 3 oz. Braille instructions available upon request.

Vendor: American Foundation for the Blind,
15 West 16th Street,
New York, New York 10011
Telephone (212) 620-2170

The following is a list of items useful in employment such as carpentry and construction work:

Modified tape measures.
Additional carpenters levels.
Stanley drill guide.
Stanley saw guide.
Cordless soldering iron.

Available at American Foundation for the Blind,
15 West 16th Street,
New York, New York 10011
Telephone (212) 620-2170

MEASUREMENTS: TEMPERATURE, PRESSURE AND HUMIDITY

Barometer 9294

Function: Measures atmospheric pressure.

Employment application: Weatherforecasts and weather reporters, scientists and engineers who use environmentally sensitive equipment. May also be useful for farmers.

Description: Unit is an aneroid barometer which measures pressures from 26 inches Hg to greater than 31 inches, Hg. Plastic dial with braille markings in inches and tenths of inches is overlayed on ordinary barometer dial. Indicator has been reinforced to withstand being touched. Moveable indicator on lacquered brass bevel allows settings to be made. Unit is fitted into a turned, polished, hardwood case and is designed for wall mounting. Measures 9" in diameter, 2-1/2" deep, and weighs 3 lbs. 8 ozs.

Vendor: Royal National Institute for the Blind,
224 Great Portland Street,
London, W1N 6AA, England.

(Note: Was not able to determine if this barometer was available with a Celsius scale.)

Barometer THM 200

Function: Measures atmospheric pressure.

Employment application: Meteorologists, weather reporters, scientists, engineers or technicians who

require environmental data for experiments or calibrations.

Description: An aneroid type barometer with raised dots at each 1/10", double raised dots at each half inch graduation, and triple raised dots at 30 degrees Fahrenheit. It is adjustable for various altitudes. Accurate to within 0.1 Hg. Brass plated case is 5 inches in diameter, weighs 1 lb. Braille instructions are available upon request.

Vendor: American Foundation for the Blind,
15 West 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Hydrometer, Bimetal

Function: Measures atmospheric humidity.

Employment application: Weatherforecasters and weather reporters; scientists and engineers working with instruments requiring controlled environments. Query vendor for full details and additional employment information.

Vendor: Japan Braille Library,
212 Swacho Shinjuku-Ku,
Tokyo, 160, Japan

Pressure Gauge With Audio-Tactile Output

Function: Measures gas pressure. Suitable choice of probe transducer will allow unit to be used as a vacuum gauge.

Employment application: Unit was originally developed to permit machinists, working with refrigeration

systems, to retain their jobs. After completing repairs, the machinist checks the system for gas leaks. Other applications include workers who monitor pressure in power tools such as upholsterers, pneumatic stapling machines, pneumatic torques, wrenches, or oxyacetylene welding machines. Sighted workers use it for remote monitoring, the auditory output allowing them to do other tasks while listening for pressure divisions in the tested system. When modified to be a vacuum gauge, unit can be used for player piano repair, vacuum moulding work, or automobile manifold and carburator testing.

Description: Consists of a box connected to the system under test by a hose. The box has on its top a crank knob with a pointer and a scale with braille markings for the pressure levels. The unit produces a buzzing sound which disappears when the pointer is adjusted to the correct pressure reading on the scale. The pressure value is then read out from the braille scale. Pressure range is from 0 to 300 psi; accuracy 1.25 psi. The scale also has raised dots at intervals (scale depends on transducer used). Units with other pressure ranges and differential pressure measurement capability can be built with this basic design. Ask vendor for full details.

Power: 120 volts AC.
Size 5" x 7" x 3".

Vendor: Smyth Kettlewell Institute of Visual Sciences,
Rehabilitation Engineering Centre,
2232 Webster Street,
San Francisco, California 94115
Telephone (415) 563-2323

Thermometer, Aud-A-Mometer Precision T-13

Function:	Converts temperature measurements to tone output which is nulled out when pointer is adjusted on dial to correct temperature setting.
Employment application:	Dark room technicians, laboratory technicians, scientists, engineers and medical technicians; some manufacturing situations where temperature measurements must be made. Operation of the unit requires using hands to adjust pointer and read tactile markings during measurement process.
Description:	Consists of a box with controls, speaker, and braille readout scale. It is connected by a flexible cable to a stainless steel probe which contains temperature sensor. Range and accuracy: darkroom model T-13-D, 65 degrees to 110 degrees Fahrenheit plus or minus 0.3 Fahrenheit; laboratory model T1-13L, minus 10 degrees to 110 degrees celsius, plus or minus 1 degree Fahrenheit: clinical model T-133, 35 degrees to 43 degrees celsius, or 95 to 110 degrees Fahrenheit plus or minus 0.1 Fahrenheit. Controls are an on-off switch and pointer, to indicate temperature reading on the braille scale.
Power:	Battery operated. Special range thermometers can be provided on request.
Vendor:	Science for the Blind Products, P.O. 120, Bala Cynwyd, Pennsylvania 19004 Telephone (215) 664-9429

Thermometer Bimetal

Function: Measures outdoor temperatures.

Employment application: Weatherforecasters, weather reporters, environmental and earth scientists, working with instruments out-of-doors, who need general, non-precision temperature measurements. The bimetal unit has a range of minus 30 to plus 50 degrees celsius, minus 22 to plus 122 degrees Fahrenheit. Query vendor for full description.

Vendor: Japan Braille Library,
212 Swacho Shinjuku-Ku,
Toyko 160, Japan.

Tire Pressure Gauge TM 203

Function: Measures air pressure in automobile and truck tires.

Employment application: Automotive repair, service station, or tire installation workers.

Description: Cylinder 12" x 14" long, at one end, it is attached to the valve stem of a tire. A rectangular plunger is forced out of the other end of the unit by tire pressure. Plunger has notches which can be felt tactily to indicate pressure. Notches progress clockwise around rod in increments of 1 lb. Has accuracy of 1 lb. range; psi 4-50. Weight: 2 ozs. Braille instructions are available upon request.

Vendor: American Foundation for the Blind,
15 West 16th Street,
New York, New York 10011
Telephone (212) 620-2170

READING SYSTEMS

Kurzweil Reading Machine

Function:	The system uses scanner, LSI computer system, special purpose electronics, and a speech synthesis unit to automatically convert printed material (books, magazines, etc.) into spoken English, including spelled speech - output on demand.
Employment application:	Lawyers, educators, administrators, scientists, engineers, and many others who require access to journals, memoranda, reference materials and reports, library and museum personnel and others who read quantities of work-related printed material. (Note: Print must be high quality for this machine to read.)
Description:	The system consists of three physical units: a desk-top reading unit, which contains a scanner, and electronic control unit containing a small computer and associated electronics, connected to the scanner by a flexible cable, and a speaker. The user places the printed reading material (the machine will also read an open book) face down on the glass plate which forms the top surface of the desk top reading unit. He or she then presses a button indicating the various materials to be scanned. The reading machine automa-tically scans and reads each text line and transmits the image to the electronic control units which generates a synthetic English speech at 150 to 200 words per minute. This machine may also be used as a talking calculator, or as a speech output device for a computer. The vendor is

continuously modifying the equipment to bring it into line with technological advancement, so please check with vendor for current details.

Vendor: Kurzweil Computer Products Inc.,
68 Rogers Street,
Cambridge, Massachusetts 02142
Telephone (617) 864-4700

NOTE: A new desk top scanner is being marketed by Synthavoice computers. Their address is:

625 Green Hill Ave., Unit 1,
Hamilton, Ont. L8K 5W9.
Telephone (416) 578-0565

Optacon Model RIC

Function: General purpose reading system which produces direct tactile reproduction of printed material. Because the Opticon translates an optical image into an identical but larger tactile image, it is not affected by different types of styles. It can be used to read any language, mathematical symbols, or even line diagrams or drawings. Attachments for the Opticon camera allow the unit to read a number of video computer terminals and electronic calculators, and to monitor materials in a typewriter.

Employment application: Virtually unlimited. Includes following: secretary-transcribers, computer programmers, engineers, and all situations where printed materials must be read, but where a delay for transcription into Braille or tape is not feasible. Accessory lenses allow computer

programmers and data terminal information retrieval personnel to read the output of CRT displays, typists to monitor materials located in the platens of certain models of electric and manual typewriters, and users to read luminous displays on electronic calculators. Employment uses of the Opticon have been well documented.

Description:

The Opticon consists of two major parts: a small camera which is moved over printed material, and a larger box containing the electronic and tactile displays. The camera contains two tiny lamps and a circuit containing 144 light-sensitive photo transistors. It also has a zoom lens capability to adjust for different print sizes. The camera lens is detachable and can be replaced by optional accessory lenses. Controls include zoom lens adjustment, Stimulator Intensity Control which adjusts the strength of the vibrations of the rods in the tactile array, threshold control which compensates for differences in the reflectivity for characters and papers, and affects the apparent stroke width of letters. Controls on the back of the unit include a battery check button which check the battery charge level, and input-output connector plugs which allow two Opticons to be joined together with a repeater cable or allows a visual display unit to be connected and a normal-invert switch which allows a user to read white letters on black background, or a luminous display such as that on electronic calculators. Unit comes with standard lens, leather carrying case with camera holder, a larger vinyl soft pack carrying case with hand carry strap and shoulder strap. First year service agreement is included.

Power: Self-contained nickel-cadmium battery or AC adaptor battery charger. Chargers are available for a variety of voltages and plug configura-tions. Contact vendor for additional details as new accessories for the Opticon are constantly being developed.

Vendor: Telesensory Systems Incorporated,
3408 Hillview Avenue,
Palo Alto, California 94304
Telephone (415) 493-2626

TACTILE GRAPHICS

Sensory Quill

Function: Provides raised line drawing or raised writing when user moves stylus over paper.

Employment application: Mathematicians, engineers, scientists who plot data on graphs or use geometric representations; computer programmers who construct flow diagrams; printers who prepare layout; designers, architects and others who use or prepare drawings; research assistants who prepare data for analysis, script-writers; pattern-makers and template-makers.

Description: Unit comes in two models. Model 1 for individual use; the mod-two for group or institutional use. Mod-1 is portable and light weight; Mod-2 is portable but sturdy and heavy for rigorous use. Both use 11" x 11-1/2" size brailon drawing paper; MM3-4 alluminum foil can be used with the institutional model to produce masters for thermo-forming. Loading tray has been designed for easy paper loading. When power

is on and the user moves the "stylus" across the page as if it were a pen, a raised line is automatically embossed along the path of the "pen". The pen may be raised or lowered to accommodate operators with heavy or light touch. Heavy, solid base for either model reduces operating noise. The institutional model is quieter.

Power: 115 volts AC.
Individual unit comes in right or left hand configurations. Specify when ordering. Options available upon request. Consult with vendor.

Vendor: Mechstat,
830 Loop 410, Suite 210,
San Antonio, Texas 78209
Telephone (512) 828-0203

Sewell Board

Function: Provides raised line drawings or raised writing when user moves plastic quill over plastic paper.

Employment application: Mathematicians, engineers, scientists who plot data on graphs or use geometric representations. Other persons who need to communicate graphic information.

Description: Flat rubber topped board with two clamps at the top. When plastic paper in inserted under clamps a stylus may be used to draw graphic represen-tations on the paper. The stylus produces raised permanent lines on plastic paper. Very inexpensive.

Vendor: Canadian National Institute for the Blind,
1929 Bayview Avenue,
Toronto, Ontario
Telephone (416) 486-2500, Ask for Homecraft Department.

(Note: Some computerized devices on the market, such as the Cranmar Modified Perkins Braille-writer, can produce graphics. Consult computer distributors or manufacturer if this is an issue of interest to you.)

TELEPHONE ANSWERING EQUIPMENT

Electromechanical Numeric Braille Display

Function: Produces paperless (soft) braille display from a telephone graphic service position system. (T.S.P.S.) (must be wired into T.S.P.S.).

Employment application: Telephone operators who use the T.S.P.S. console. Potential users should query local telephone company about connection and service policy for this type of equipment before ordering or building units.

Description: Units now in use consist of 12 braille cells. (2 x 3 dot matrix) wired into T.S.P.S. systems at various Bell Telephone Systems. The system consists of a microprocessor-controlled braille display. A plastic plate has holes through which solenoid-actuated pins protrude to produce the braille characters. Interfacing electronics are included to adapt units for use. Query vendors for details.

Vendor:

Professor Derek Rowell, Director,
Sensory Aids Evaluation and Development Centre,
Massachusetts Institute of Technology,
77 Massachusetts Avenue,
Cambridge, Massachusetts 02140
(617) 253-5331

Lamp Activated Signal Terminal (L.A.S.T.)

Function:

Allows a blind person to operate a standard multi-line telephone system and identify which lines have active calls, calls on hold, or incoming calls.

Employment application:

Receptionists, secretaries, ordering clerks, inventory clerks and other clerical personnel who are responsible for handling telephone calls in an office or supply company setting. Potential users should query local telephone company and vendor about installation policies and service.

Description:

The L.A.S.T. is a box which sits next to the multi-line telephone and is connected to the telephone call director by a cable and standard amphenol plug. The top surface of the unit has holes through which solenoid-actuated pins protrude to indicate the status of the telephone lines. The pins remain below the surface if lines are inactive, protrude upwards approximately 1/4 of an inch for active lines, and pulsate up and down for line with incoming calls, or lines on hold. Unit requires no special wiring or adaptation of the telephone system and can be connected and disconnected easily. Both 6-line units and 20-line units are available. Query vendor for additional information.

Power: No external power source is required. Measures approximately 7" x 5" x 2". Weighs approximately 5 lbs. The case is made of metal and plastic.

Vendor: Ray Disinger, Pacific Telephone Co.,
500 East Main St., Room 214,
Alhambra, California 91801
Telephone (213) 576-6666

(Note: In Canada, please contact your Bell Canada Special Needs Centre. Contact either regular directory assistance or 1-800- directory assistance for the number in your area.)

Telephone Indicator

Function: Allows blind persons to identify which line in a multi-line telephone is active, incoming or on hold.

Employment application: Receptionists, secretaries, or other workers who deal with multi-line telephones. Potential users should query local telephone company and vendor about installation policies and services.

Description: Consists of a small box which has tactile symbols on its top representing the lines available on the multi-line telephone. When the symbol corres-ponding to an active line is touched, a steady tone is produced. A line with an incoming call or a call on hold produces a beeping tone. The indicator box is connected to the telephone line and telephone lamp circuitry through a standard Y-amphenal connector.

Power: Unit draws power from lamp circuitry within the telephone.
Measures approximately 4" x 6" x 2".

Vendor: V. Cranmar Director,
Division of Technical Services,
Bureau for the Blind,
State Office Building, Annex,
P.O. Box 758
Frankfort, Kentucky 40602
Telephone (502) 564-4754.

Touch-Tone Adaptor

Function: Allows blind person to use a 10-button, 9-line telephone system, and identify which lines have active calls, calls on hold or incoming calls.

Employment application: Receptionists, secretaries, ordering and processing clerks, inventory clerks, and other clerical personnel responsible for handling multi-line business telephones.

Description: Consists of a set of solenoid-activated buttons which give a blind person (by touch) the same information about a multi-line telephone as do the lamps on a regular phone. The buttons are assembled in a row with the same spacing and mounting arrangement as the line selector keys on the standard 10-button telephone. The button tops are normally flush with the phone face plate. Each button is activated upwards at the same time the corresponding lamp is on. Thus, when a line is in use the button is up continuously. When a line is on hold, the button is up except for a brief drop twice

each second (corresponding to winks). During incoming rings the buttons alternate up and down each second ("Flash").

The assembly has its own amphenol-ended cable which plugs into the key-system cable, a separate power unit, includes a walnut grained plastic trim plate through which the buttons extend. It is normally mounted in place of the upper key row in a 20-button phone, resulting in a 10-button, 9-line touch-tone.

Power: 110 volts AC.
Touch-tone switch assembly measures 8" x 3". Installation is required since one row of the buttons in the standard 20-button telephone must be removed and replaced with the switch assembly. New units are being researched.

Vendor: Telephonic Equipment Corporation,
17401 Amrmstrong Avenue,
Irvine, California 92714
Telephone (714) 546-7903

Traffic Service Position System (T.S.P.S.) Interface System

Function: Enables blind telephone (T.S.P.S.) operators to handle all telephone calls requiring operator assistance, with exception of "Information" number requests.

Employment application: Telephone operators. Permits blind T.S.P.S. operators to meet performance standards for sighted operators.

Description: The system is an intelligent (voice) output system that can automatically determine what information a blind operator needs to

complete calls. The telephone company console consists of an operator control panel with lighted push buttons and indicators, and a 12-lamp Nixie tube display. The interface system consists of a console overlay with clear acrylic buttons and is equipped with photo-sensors to detect the status of indicator lamps, an optical sensing system to read the Nixie tube display, interface control, micro-computer and power supply, a voice synthesizer, and operator's control box which allows the operator to control the entire system and to interrogate the system for specific information, and an earphone. The overlay is placed directly over the operator control panel. The transparent buttons allow sighted training personnel and supervisors to determine call status. The removable and portable optical system is attached to the front of the Nixie tube display; an adjustor is provided to align the optical sensing system to a particular console. The interface/control electronics module accepts commands from the operator control box, processes data from the optical sensing system and console overlay, and generates suitable output to a Votrax Voice Synthesizer. The Votrax Speech Output is presented to the operator via a second earphone (the incoming call is on the first earphone). The entire system is carried on a movable cart with self-contained power supply.

Power: 12 volt DC power and inverter, which converts DC voltage to 115 volts AC. Provides power for eight hours continuous operation. Battery charger recharges battery at end of shift.

Vendor: Telesensory Systems Incorporated,
3408 Hillview Avenue,
Palo Alto, California 94304
Telephone (415) 493-2626

TOOLS

Dove Tailing Guide 9430

Function: Aligns the blade of a tenon saw for cutting dove tails.

Employment application: Carpenters, cabinet makers, other workers in construction trades.

Description: Unit consists of two short pieces of wood attached in cross fashion. Three of the four ends of the cross piece have beveled edges. Measures two inches by two inches; weight, 1 oz.

Vendor: Royal National Institute for the Blind,
224 Great Portland Street,
London, W1N 6AA, England.

Drill Positioner TS 275

Function: Enables a blind user to align a drill at 90° angle to surface into which he/she wishes to drill. Drill bit is placed in the angle to provide the align-ment. It can be particularly useful when working surface is at an unusual height or angle.

Employment application: Woodworking, metal working, or construction jobs where correct alignment of hand-held drill is necessary. Unit is made of aluminum and is designed for light-weight work.

Description: A piece of aluminum angle which has flanges at one end. The flanges have holes which allow it to be attached to work at hand to hold unit in place while holes are being drilled. Accommodates drills of any size, lines up twist drills or wood bits. Length: 2 inches. Flanges extend 1 inch. Weight, 1 oz.

Vendor: American Foundation for the Blind,
15 West 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Stanley Combination Square TM 211

Function: Can be used as a straight edge, tri-square, mitre-square, or depth gauge. Also has a scriber.

Employment application: Carpentry and construction trades. Markings not designed for precision work.

Description: A regular Stanley combination square that has been adapted by including raised dots at 1/8 inch intervals. The straight edge portion is 12 inches long and approximately 1-1/2 inches wide. The handle is 4-1/2 inches long. Includes level and scriber. The level is not adapted for use by blind persons.

Vendor: American Foundation for the Blind,
15 West 16th Street,
New York, New York 10011
Telephone (212) 620-2170

Stanley Framing Square TM 212

Function:	For measuring, marking-off right angles, or use as a straight edge.
Employment application:	Carpentry and construction trades.
Description:	An L-shaped piece of metal. Tactile markings appear at 1/8 inch intervals on both inside and outside edges of the square. Size - 16 by 24 inches.
Vendor:	American Foundation for the Blind, 15 West 16th Street, New York, New York 10011 Telephone (212) 620-2170

Wood-Marking Gauge TS 276

Function:	Places a tactile mark or line on a piece of wood at a pre-selected distance from an edge.
Employment application:	Carpentry and construction trades.
Description:	Cast aluminum ruler with tactile markings and a second metal piece that slides over the ruler and can be set to a particular length with a friction load. A removable brad awl point on the slide is used to cut a line into the piece of wood being worked on.
Vendor:	American Foundation for the Blind, 15 West 16th Street, New York, New York 10011 Telephone (212) 620-2170

TYPING AIDS

Copy Holder B2

Function:	Holds material to be typed in an adjustable position over typewriter for easy reading.
Employment application:	Secretaries, typists, othes who type material from draft copy; musicians or music therapists who need music scores held closer to the eye than standard music stands; engineers, technicians who refer to circuit drawings and designs.
Description:	A copy holder clamps on desks, tables, or any horizontal surface up to 2-1/4 inches thick. Flexible arm movement twists, turns or stretches up, down or around to the desired position for easiest viewing of draft material while typing. Spring-balanced arm movement makes possible copy placement where it is needed within a thirty-six inch radius of mounting. Copy holder holds up to 22 sheets of 8-1/2 by 11 inch paper. All-metal construction with black, baked enamel finish; copy holder is heavy gauge aluminum with clamp to hold copy in place; arm is steel tubing with tempered steel springs. Measures 13 inches by 9-1/2 inches. Weighs 4-1/4 pounds.
To Order:	Contact commercial stationers.
Vendor:	Oxford Pendaflex Corporation, Clinton Road, Garden City, New York 11530 Telephone (516) 741-3240

VISUAL AIDS: ELECTRONIC

Apollo Systems

Function:	Various models use a television camera to view printed or hand written material or drawings; monitor typewritten material while still in the typewriter, view material at a distance such as bulletin boards across a room, and produce the viewed material on a television monitor screen in magnified high-contrast form.
Employment application:	Used by secretaries, typists, medical or legal transcribers who read, transcribe, proof or type printed or written materials or pre-print forms; library personnel, credit reference clerks, records clerks who read printed and micro-fiche card material; scientists, engineers, business persons, lawyers, teachers who read quantities of material associated with their work; technicians who read blue-prints and circuit designs, and monitor assembly tasks. (Low Vision Aids). The split-screen feature of this system permits typists to monitor draft copy and typewritten material simultaneously.
Description:	System consists of two basic components: a television camera with support system which views the printed or other material, and a television monitor which reproduces the image in enlarged form. All units have circuitry to increase light to dark contrast and select positive (black characters on white background), or negative (white characters on black background) images, illuminators, white on black indicators for the controls, and viewing platforms.

Power: 117 volts AC.

(Note: Several models are on the market. Many incorporate the following features; flexibility, lighter weight camera, and smaller monitor screen. Camera allows 360° horizontal viewing for across room reading and for tilting and raising and lowering of camera to increase magnification of field of viewing of material on XY platform. Retractable typewriter viewing aid permits user to view what is being typed. A sixteen by sixteen inch XY viewing platform allows 11 by 11 inch travel, has adjustable drag control, pinch-style margin stops and a tactile locking device for stationing the platform. Systems have built-in illuminators. The following is a list of models currently available on the market:

Model 2C
Model 4A
Model 4B
Model SE, (secretarial system),
and
Portareader

Options Include:

adjustable monitor stand,
fixed monitor stand,
margin stops,
electronic window on
Model 4A and 4B,
micro-fiche attachments,
scan adaptor and a tri-pod.

Query vendor for details.

Vendor: Apollo Lasers Incorporated,
6357 Arizona Circle,
Los Angeles, California 90045
Telephone (213) 776-3343

Electronic Incandescent Display

Function: Provides bright incandescent display of electronic calculator output.

Employment application: Secretaries, bookkeepers, sales personnel and managerial persons who work with financial data; scientists, engineers, technicians, mathematicians and statisticians or other occupations where complex calculations are required; insurance sales persons, claims examiners and claims adjusters whose jobs demand access to a calculator.
Ask vendor about possible adaptation to read laboratory digital measuring equipment displays.

Description: Consists of a display which uses bright incandescent bulbs to produce numeric display, in numbers two inches high, of the output of electronic calculators. Device must be wired into the calculator through a plug, and the internal wiring of the calculator must be altered. Potential users should investigate whether alterations void existing warranties or service agreements for calculators.

Power: 115 volts AC.
Measures 15 inches by 4 inches by 2-1/2 inches.

Vendor:

V. Cranmar, Director
Division of Technical Services,
Bureau for the Blind,
State Office Buildings, Annex,
P.O. Box 758,
Frankfort, Kentucky 40602
Telephone (502) 564-4754

Low Vision Aid LVA 501, LVA 401

Function:

Material placed under camera of closed circuit television system is enlarged and presented in high contrast on CRT monitor sceens.

Employment application:

Partially sighted individuals such as secretaries, typists, or medical or legal transcribers who read, transcribe, proof or type printed or hand-written materials or pre-printed forms; library personnel, credit reference clerks, records clerks who read printed and micro-fiche card material, scientists, engineers, business persons, lawyers, teachers who read quantities of material associated with their jobs; technicians who read blue-prints and circuit designs and monitor assembly tasks.

Description:

Model 501 system consists of a television camera, a CRT monitor and a scanning table. The camera is a 2:1 inter-laced vidicon tube with six-hundred-line resolution and a 6:1 variable focus zoom capability.

Magnification is from 7X to 43X. Monitor with 19 inch screen produces image with black on white, or white on black background. All circuits are solid-state. Scanning table has

travel area of 12 inches by 12 inches with adjustable drag and margin stops. The unit has its own illumination sources.

Power: 117 volts AC.
Weight, 105 lbs. Is mounted on desk high frame with rollers for mobility.

Vendor: Pelco Industries Incorporated,
351 East Alondra Boulevard,
Gardena, California 90248
Telephone (213) 323-1628

Secretarial System

Function: Allows partially sighted person to use an electronic visual aid (CCTV) with a standard moving carriage typewriter, permitting simultaneous viewing of written material being transcribed and typewritten copy.

Employment application: Situations where extensive typing from written or printed drafts must be done; secretaries, typists, inventory clerks, purchasing agents or bookkeepers.

Description: Note: easily re-constructed:
A wooden frame holds a typewriter in position for normal use. Above and slightly behind the typewriter platten, is a platform for holding material to be copied. The electronic visual aid camera is mounted, pointing upward, behind the typewriter and copy holder. Mirrors are used to transmit images from written copy and typewriter to the camera lens. The arrangement of these mirrors is such that it creates a split-screen image with the materials being copied in one part, and the typewriter platten in the other.

Power: The unit has its own illumination source.

Vendor: Rand Corporation,
1700 Main Street,
Santa Monica, California 90406
Telephone (213) 393-0411

Visual Tek RS
Left/Right Systems

Function: Various models use a television camera to reprint printed or hand-written material, monitor typewritten material as it is being typed, read micro-fiche, view computer CRT terminals, or view printed material at a distance, such as bulletin boards across a room, and produce the viewed material on a television monitor screen in magnified high contrast form.

Employment application: Used by partially sighted individuals such as secretaries, typists, or medical or legal transcribers who read, transcribe, proof or type printed or written materials or pre-printed forms; library personnel, transcriptionists, credit or reference clerks, who read printed and micro-fiche card material; scientists, engineers, business persons, lawyers, teachers who read quantities of material; technicians who read blue-prints, circuit designs, and monitor assembly tasks; programmers or data entry operators working with computer CRT displays. The split-screen feature of model RS6 permits typists to monitor draft copy and typewritten material simul-taneously.

Description: Systems have two basic components: a camera which views the written or printed materials, and a television monitor which reproduces

material in enlarged form. All units have circuitry to increase light-to-dark contrast and select positive (black characters on white background) or negative (white characters on black background) images.

Power: 117 volts.

Six basic models are available:

1. RS6 System:
2. RS7:
3. Mini-viewer:
4. Micro-viewer:
5. Commuter:
6. CVS (Cathode Ray Tube Viewing System)

Query vendor for specific details on each model.

Vendor: Visual Tek,
1610 26th Street,
Santa Monica, California 90404
Telephone (213) 829-3453
Also contact the CNIB for Canadian distribution. Telephone (416) 486-2500

Dual X-Y Table (Accessory for electronic visual aids)

Function: Used in conjunction with an electronic visual aid to enable a partially sighted person to both read and reference materials such as books and magazines, and to make hand-written notes of that material. Table permits user to look from one item to the other without searching for the proper place.

Employment application: Occupations where extensive library research is required; lawyers, medical researchers,historians, or social scientists; clerical occupations where material must be copied from one reference into notes or different format.

Description: Unit consists of two separate platforms which move together in the left-right direction and move independently in the forward-backward direction under an electronic visual aid lens. (X repre-sents right-left and Y represents forward-backward movement.) Query vendor regarding modifications to this table.

Vendor: Rams Corporation,
1700 Main Street,
Santa Monica, California 90406
Telephone (213) 393-0411

(Note: So numerous are the optical visual aids that they are not all listed here. Consult with eye care specialist in order to determine the most appropriate aid for you.)

VOICE OUTPUT DEVICES

(A number of computer companies are now developing synthesizers or voice syntheses computer chips.).

Spellex-3

Function: Provides spelled-speech output to monitor typing on an IBM selectric typewriter with automatic erase feature, a computer terminal, or an electronic calculator.

Employment application: Typists, secretaries, medical or legal transcribers; computer programmers,data entry personnel; accountants, bookkeepers, scientists, engineers who use electronic calculators.

Query vendor regarding interface capability with digital measurement equipment.

Description: Consists of a small box, connected to the typewriter, terminal, or calculator, by a cable which converts digitally coded alpha-numeric symbols to spelled-speech output. Has a vocabulary of 77 sounds. The unit will accept either parallel, selectric code or serial ASCII. When used with the typwriter, each time a key is pressed the voice pronounces the letter or punctuation mark. Spellex has a memory which stores the last three typed words and can repeat them on demand, allowing the typist to listen to the last words on the page in case of interruptions. When used with a computer terminal, Spellex will spell out any line of program on demand. When used with a calculator, Spellex pronounces the word equivalents of ten digits and most arithmatic operations when a button is pushed to command voice output. The rate of spelled-speech can be varied up to 25 to 30 words per minute to suit the user. Above this the sounds tend to run together. Spellex has an earphone jack and a built-in speaker. Controls include on/off, volume, rate of speech, and memory playback.

Power: 120 volts AC.
Vendor developing a number of interesting modifications to this device.

Vendor: Dept. of Electrical Engineering,
The University of British Columbia,
2075 Wesbrook Place,
Vancouver, B.C. Canada V6P 1W5
Telephone (604) 228-3279
Contact Michael P. Beddoes or Fred Schuman.

Votracks Electronic Voice System

Function: Produces spoken output based on commands from a computer, synthesizes vocal output from digital codes. Unit is used as the voice output component in other systems such as the TSPS (Traffic Service Position System) interface system.

Employment application: Computer programmers; credit verifiers in banks, inventory clerks, order processors; telephone operators using the TSPS system; computer based word processing system operators; engineers, scientists, and technicians who require spoken output from digital measuring equipment or systems such as aircraft light simulators. All applications require appropriate electronic interface and flash or computer software. Potential users should verify interface and software requirements for existing job-site equipment before purchase. Query vendor for information about particular applications.

Description: There are two Votracks models; model VS-6 and model M-1. Model VS-6 provides voice output from computers or communication systems, using phonetic coding of words or phrases stored as digital information on external storage media, such as magnetic disc or solid-state memory. This external storage capability allows a large vocabulary of over 300,000 words. Separate interface units and

keyboards provide compatibility with most computers and communications equipment (EIA serial and TTL parallel). In the case of the EIA unit the inteface controls are comparable to Bell 103 and 202 type modems. Asynchronous communications adaptors, compatible to these modems, will attach to Votrack without modification, allowing standard ASCII teminal driver software to provide device support for Votracks. Data formats are either serial ASCII or eight-bit parallel. Optional interface types and other options allow Voltrack's compatibility to computers ranging from large main frames to microprocessors. Data rates are 110, 150, 300, 600, 1200, 2400, 4800 and BPF 9600. The eight-bit command word selects phoneme, pause, instruction, and the control function. Model ML1 provides multi-lingual vocabulary in English, German, Italian and Spanish. Other languages may be developed. It uses a twelve-bit command word.

Interface types include EIA serial (RS232C) 403-type dataset compatible; EIA serial (RS232C) 407-type dataset compatible; dataswitch (connects to asynchronous ASCII terminal) buffered parallel (TTL shift register); unbuffered parallel (TTL); hypho buffered parallel (TTL); keyboard which connects to a separate phonetic keyboard. Verify your interface requirements with vendor. Controls on unit consist of on/off switch, speech rate, pitch and audio level knobs. Audio output is 100 to Hz 5000; six volts peak; audio output drive, 0.5 Watts into an 8 ohm mode.

Power: 115 volts AC.

Options include dataset, 403 type; accoustically coupled touch tone pad; external pitch adjustment; phonetic keyboard; vocabulary development source; extra low amplifier with tone control; and customized interfaces. Query vendor for detailed information. VS-6 unit measures 11-7/8" wide by 11-1/4" deep and 3-1/8" high. Weight: 11 pounds. ML-1 unit measures 11-7/8" wide by 11-1/4" deep and 6-1/4" high. Weight: 20 pounds. Query vendor regarding separate hori-zontal wrap, portable case, phonetic keyboard speakers and options described above.

Vendor:

Vocal Interface Division,
500 Stephenson Hwy.,
Troy, MI 48084
Telephone (313) 588-2050

A SAMPLER OF JOBS HELD BY DISABLED PEOPLE

The purpose of this index is to relate the broad groupings of technologically similar jobs. The reader is reminded, however, that each job is unique and each worker brings to a given job his or her own abilities and limitations, which will define specific equipment needs. The index is intended primarily as a resource to expand the reader's own thinking about the many job categories that have been successfully filled by persons with disabilities. The index is also intended to encourage the exploration of increasingly sophisticted technological aids to meet the needs of the disabled population. Therefore, a selection of job placements is included to illustrate the wide range of occupations successfully filled by disabled persons. This partial listing is intended to spur the reader's consideration of other job areas, and to enlarge the scope of job possibilities beyond that considered as traditional for persons with disabilities.

ARCHITECTURE, ENGINEERING, MATHEMATICS, PHYSICAL AND LIFE SCIENCES

Associate Engineer, Chemistry and Encapsulation,
Computer Programmer,
Computer Programmer Analyst,
Counsellor - Elementary School,
Drafts Person,
Electronics Technician,
Engineering (Chemical, electrical, electronics, petroleum production, steam, systems),
Engineering Designer,
Meteorologist,
Physical Science Technician,
Psychometrist,
Research Consultant,
Systems Analyst,
Vocational Rehabilitation Counsellor.

SOCIAL AND MEDICAL SCIENCES

Assistant Director,
Visiting Nurse Program,
Anthropologist,
Chiropractor,
Dental Assistant,
Dietician,
Doctor,
Historian,
Hot Line Operator,
Human Services Aid,
Laboratory Assistant,
Mental Health and Educational Consultant,
Music Therapist,
Occupational Therapist,
Physical Therapist,
Psychiatric Technician,
Psychiatrist,
Speech Therapist,
Visual Aids Specialist,
Vocational Nurse.

TEACHING AND EDUCATION

Assistant Farm Advisor to Government Department,
County Home Demonstration Agent,
Crafts Teacher,
Teacher's Aid,
School Principal,
Teacher (adult education, college, faculty, elementary school, foreign language, high school faculty, music, physical education, shop, mechanics, woodworking, special education),
Teaching Associate.

ART, WRITING, GRAPHIC ARTS, MUSEUM, LIBRARY SCIENCES

Advertising Copy Writer,
Artist,
Assistant Museum Curator,
Audio Visual Librarian,
Bindery Worker in Printing Company,
Children's Librarian,
Commercial Artist,
Commercial Film Processor,
Dark Room Technician,
Editors (books, magazines, newspapers),
Editorial Assistant,
Interpreter (government department),
Journalist,
Radio Archivist,
Recording Tape Duplication Technician,
Research Analyst,
Writer (free-lance, sports, technical).

LAW & JUDICIAL PROFESSIONS

Assistant District Attornies,
Deputy Court Clerk,
Investigators,
Judge,
Law Examiners,
Para-Legal Trainees,
Trial Lawyers.

RELIGIOUS OCCUPATIONS

Ministers,
Religious Activity Director.

AMUSEMENT & RECREATION OCCUPATIONS

Actors,
Actresses,
Composer/Arranger,
Conductor,
Disc Jockey,
Musician,
Radio Broadcaster,
Radio Production Engineer,
Sacred Music Vocalist,
Music Teacher,
Vocalist,
Administration/Management.

MISCELLANEOUS PROFESSIONAL & TECHNICAL

Administrative Assistant,
Assistant Store Manager,
Assistant to Bank Director,
Bank Loans Officer,
Bank Manager,
Building Contractor,
Caterer
Coordinator of Government Projects,
Coordinator of Community Services and Projects,
Drug Abuse Program Coordinator,
Foreign Services Officer,
Juvenile Case Worker,
Literary Agent,
Manager/Retail Store,
Museum (disability specialist and program coordinator),
Office Manager,
Owners (landscape companies, photo-copy business, retail stores),
Probation Officer,
Purchasing Agent,
Sales Manager,

Supervisor (bank departments and divisions of government),
Taxidermist,
Tax Preparer.

CLERICAL OCCUPATIONS

Bank Clerk,
Bank Teller,
Bookkeeping Machine Operator,
Duplicating Machine Operator,
Braille Proof Reader,
Clerk/Typist,
Collection Agent,
Court Reporter,
Credit Verifier,
Deputy Court Clerk,
Executive Secretary,
File Clerk,
Hospital Ward Clerk,
Insurance Claim Examiner,
Inventory Control Clerk,
Job Information Specialist,
Keypunch Operator,
Legal Secretary,
Library Assistant,
Mailroom Clerk,
Medical Transcriber,
Operator, Telephone Answering Service,
Receptionist,
Regional Staff Assistant,
Scheduler Service Department,
Dispatcher,
Secretary,
Government Information Service Personnel,
Stock Clerk,
Tax Examiner,
Telephone Operator,

Telephone Service Representative,
Telephone Switchboard Operator,
Time Keeper,
Tool Crib Attendant,
TSPS (traffic service position service)
Operator with Telephone Company,
Word Processing Operator.

SERVICE OCCUPATIONS

(Domestic, food service, lodging, personnel, animal care, apparrel, furnishing, protective building service)

Babysitter,
Baker,
Barber,
Bus Boys,
Cooks,
Cosmotologist,
Hair Stylist,
Custodian,
Dishwasher,
Funeral Director,
Gymnasium Attendant,
Kitchen Helper,
Hotel Maid Service,
Motel Manager,
Nursery School Aid,
Nurseis Aid,
Owner/Manager Rest Home,
Police Dispatcher,
Security Guard,
Sexton,
Stable Hand,
Tour Guide,
Waitress/Cashier.

AGRICULTURAL, FOOD PROCESSING OCCUPATIONS

Assistant Landscaper,
Bee-Keeper,
Candy Maker,
Cattle-Rancher,
Dairy Farmer,
Dog Breeder,
Farm Manager,
Fisherman,
Florist,
Flower Grower,
Fruit-Farm Foreman,
Fur Farmer,
Gardner,
Greens-Keeper,
Hatchery Manager,
Horticulturist,
Milking Machine Operator,
Nurseryman,
Park Foreman,
Poultry Farmer,
Shepherd,
Soil Conservationist,
Worm Farmer.

PROCESSING, REFINING & EXTRACTION OCCUPATIONS

Electroplater.

MACHINE TOOL, BENCH AND CONSTRUCTION WORK

Boat-Builder,
Brick-Layer Helper,
Cabinet Maker,
Carpenter/Electrical Layout Worker,
Dressmaker,
Drillpress Operator,

Furniture Finisher,
Furniture Manufacturer,
Lathe Operator,
Lock-smith,
Machine Operator,
Pipe-Fitter,
Plumber-Helper,
Punch Press Operator,
Sewing Machine Operator,
Tailor,
Upholsterer,
Welder.

ASSEMBLY & REPAIR WORK

Automotive Repair Person,
Electronics Assembler,
Equipment Maintenance Technician,
Hand-Packager,
Motorcycle Repair Person,
Piano Tuner,
Technician/Repair Person,
Quality Assurance/Assembler,
Small Appliance Repair Person,
Small Engine Repair person,
Testing Technician,
Television Repair Person.

MANUFACTURERS AND VENDORS

American Foundation for the Blind
15 West 16th Street
New York, New York, 10011
(212) 620-2170

American Printing House for the Blind
P.O. Box 6085
Louisville, Kentucky, 40206
(502) 895-2405

Apollo Lasers Inc.
6357 Arizona Circle
Los Angeles, California, 90045
(213) 776-3343

Ball Brothers' Research Corp.
P.O. Box 2078
Bolder, Colorado
Attention: C.H. Wood, Marketing Manager
(303) 441-4682

Betacom Services for the Disabled
6160 Van Den Abeele
St. Laurent, Quebec,
H3S 1B9
(514) 335-1058

South Western Ontario Distributors
Technibility Incorporated
67 Ontario Street
Toronto, Ontario,
M5A 2V1
(416) 947-0730

Blazie Enterprises
1311 Montreal Drive
Aberdeen, Maryland, 21001
(301) 734-6804

Canadian National Institute for the Blind
1929 Bayview Avenue
Toronto, Ontario
M4G 3E8
(416) 486-2500
(Toronto Head Office, Check own area for local office.)

Clement Laboratories Incorporated
2560 Wyandotte
Mountain View, California, 94040
(415) 964-0921

Deutsche Blinderstudieanstalt
An Schlag 8, D-355
Marburg/Lahn, West Germany

Division of Technical Services Bureau for the Blind
State Office Building, Annex
P.O. Box 758
Frankfort, Kentucky, 40602
(502) 564-4754

Elinfa Incorporated
1725 K Street N.W., Suite 1114
Washington, D.C., 20006
(202) 857-0684

Howe Press of Perkins School for the Blind
Watertown, Massachusetts, 02172

Japan Braille Library
212 Swacho, Shinjuku-ku
Toyko, 160
Japan

Keypact Division
Computone Systems Incorporated
1 Dunwoody Park
Atlanta, Georgia, 30338
(404) 393-3010

Kurzweil Computer Products Incorporated
68 Rodgers Street
Cambridge, Massachusetts, 02142
(617) 864-4700

Lexicon Incorporated
60 Turner Street
Waltham, Massachusetts, 02154
(617) 891-6790

Maryland Computer Services Incorporated
101 Thomas Street
Belair, Maryland, 21014
(301) 838-8888

Canadian Distributor:
Synthavoice Computer Services
625 Greenhill Ave., Unit #1,
Hamilton, Ontario
L8K 5W9
(416) 578-0565

Massachusetts Institute of Technology
77 Massachusetts Avenue
Cambridge, Massachusetts, 02140
Attention: Derek Rowell, Director
(617) 253-5331

Master Specialities Corp.
1640 Monrovia
Costa Mesa, California, 92627
(714) 642-2427

Mechstat Incorporated
830 N.E. Loop 410, Suite 210
San Antonia, Texas, 78209
(512) 828-0203

Oxford Pendflex
Clinton Road
Garden City, New York, 11530
(516) 741-3200

Pacific Telephone Company
500 East Main Street, Room 202
Alhambra, California, 91801
Attention: Ray Disinger
(213) 576-6666

F.H. Papenmeier
Electronics
Talweg #2
Postfach 1620
D-5840 Schwerte 1
West Germany

Pelco Industries Incorporated
351 East Alondra Boulevard
Gardena, California, 90248
Attention: Mr. P. Morin
(213) 323-1628

Rand Corporation
1700 Main
Santa Monica, California, 90406
(213) 393-0411

Royal National Institute for the Blind
224 Great Portland Street
London, W1N 6AA
England

Science for the Blind Products
P.O. Box 120
Bala Cynwyd, Pennsylvania, 19004
(215) 664-9429

Smyth-Kettlewell Institute of Visual Sciences
Rehabilitation Engineering Centre
2232 Webster Street
San Francisco, California, 94115
Attention: Bill Gerrey
(415) 563-2323

Speech Systems Incorporated
P.O. Box 11356
Palo Alto, California, 94306

Synthavoice Computer Services
625 Greenhill Ave., Unit #1,
Hamilton, Ontario
L8K 5W9
(416) 578-0565
(Canadian Distributor for Maryland
Computer Services and Hewlett-Packard)

Telefonic Equipment Corp.
17401 Armstrong Avenue
Irvine, California, 92714
(714) 546-7903

Telephone Pioneers of America
421 Southwest Oak Street, Room 107
Portland, Oregon, 97204
(503) 242-8326

Telesensory Systems Incorporated
3408 Hillview Avenue
Palo Alto, California, 94304
(415) 493-2626

Canadian Distributors:
Betacom Services for the Disabled
6160 Van Den Abeele
St. Laurent, Quebec
H3S 1R9
(514) 335-1085

Southwesten Ontario Contact:
Technibility Incorporated
67 Ontario Street
Toronto, Ontario
M5A 2B1
(416) 947-0730

Triformation Systems Incorporated
3132 S.E. J Street
Stuart, Florida, 33494
(305) 283-4817

University of British Columbia
Department of Electrical Engineering
2075 Wesbrook Place
Vancouver, British Columbia
V6T 1W5
Attention: Michael P. Beddoes, or Fred Schumann
(604) 228-3279

Variable Speech Control Co.
185 Berry Street
San Francisco, California, 94107
(415) 495-6100

Visualtek
1610 26th Street
Santa Monica, California, 90404
(213) 829-3453

Canadian Distributor:
Contact CNIB Head Office
(for name of new Visualtek Representative and name and address)
(416) 486-2500

Vocal Interface Division
500 Stephanson Highway
Troy, MI, 48084
(313) 588-2050

Wespro
4442 Casson Road
Syracuse, New York, 13215
Attention: Larry Waldron
(315) 469-7182